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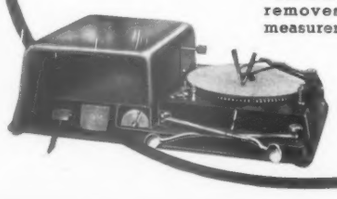

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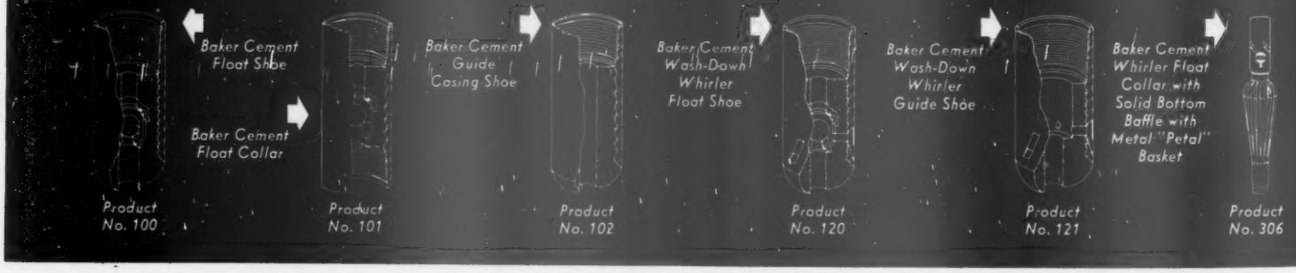
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# Trends

## Southwestern Areas Secure First Price Advance in 4 Years

MID-CONTINENT and Gulf Coast producers on Saturday and the first of this week were given their first general advance in crude-oil prices in over 4 years. The new schedules announced up to Wednesday provided increases of 5 to 11 cents per barrel in Texas and 5 cents in Oklahoma, Kansas and the Illinois basin. The comparative importance of these advances is apparent from a study of the changes that have taken place in the posted schedules for 36-gravity crude oil of Mid-Continent fields in recent years. A price of $1 per barrel for 36-gravity crude oil became effective under the N.R.A. in the fall of 1933.

It continued in effect until 1936 when advances materialized. The stronger market continued until January 1937, when a top of $1.22 was posted for the 36-gravity grade. Postings were reduced in the fall of 1938 and a price of $1.02 was in effect during 1939, 1940 and this year until April 1. The new price is $1.07 per barrel. While no official explanation has been given for the latest price adjustments, it is agreed that they reflect the recent improvement in both crude-oil and refinery markets at several points with the expectation that the large gains in gasoline demand assured for the next few months will bring further increases.

CRUDE PRODUCTION *3,762,680 bbl. daily average—up 77,300 bbl. One year ago 3,855,287 bbl.*

CRUDE STOCKS *263,857,000 bbl. as of March 22—down 447,000 bbl. One year ago 247,401,000 bbl.*

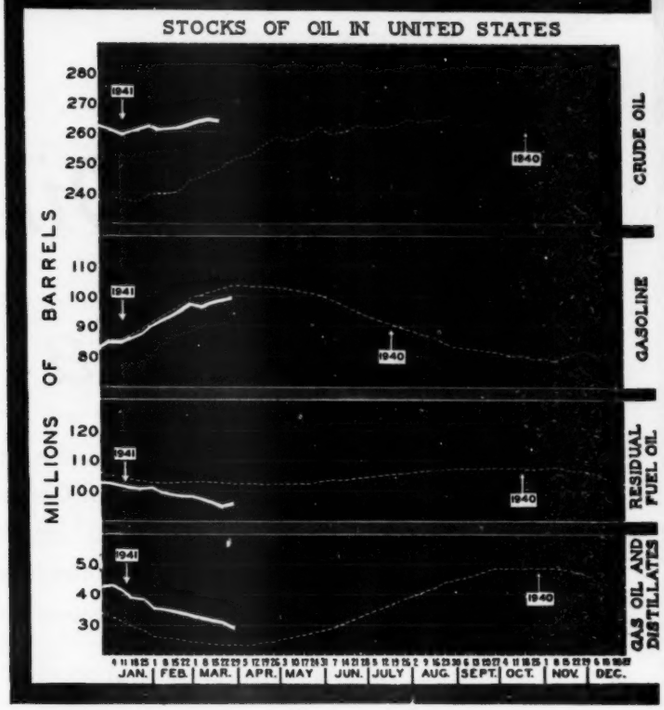
GASOLINE STOCKS **99,727,000 bbl. as of March 29—up 186,000 bbl. One year ago 103,425,000 bbl.*

RESIDUAL FUEL-OIL STOCKS *96,152,000 bbl. as of March 29—up 563,000 bbl. One year ago 102,859,000 bbl.*

GAS OIL AND DISTILLATES *29,949,000 bbl. as of March 29—down 646,000 bbl. One year ago 23,186,000 bbl.*

REFINERY RUNS *3,625,000 bbl. daily week ended March 29—down 30,000 bbl. One year ago 3,585,000 bbl.*

*Includes 6,462,000 bbl. of aviation fuel.

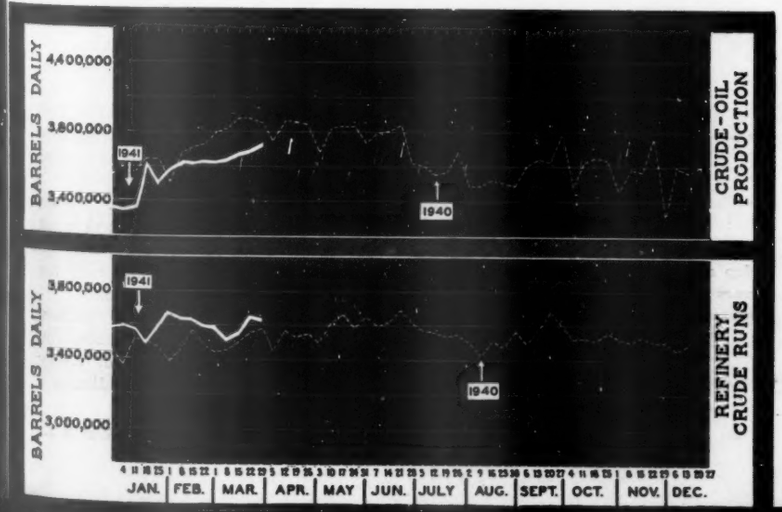



The order of the increases starting in Texas was the opposite of what had been expected by many. The crude-oil markets of the Illinois basin and Oklahoma-Kansas have strengthened steadily since the first of the year with several large and small buyers unable to cover their April requirements in full. This strength over the past month has carried over into the refinery markets and spot gasoline quotations at many Oklahoma-Kansas and middle western refineries have advanced fractionally. Posted-dealer and retail price conditions in those areas have also stiffened.

### *DAILY AVERAGE PRODUCTION FOR WEEK*

| | Mar. 29, 1941 | Bur. Mines Mar. est. of demand | March state allowables | Mar. 22, 1941 |
|---|---|---|---|---|
| Arkansas | 70,940 | 69,700 | 69,969 | 71,210 |
| California | 606,250 | 596,400 | 571,500 | 610,250 |
| Eastern fields | 118,100 | 119,100 | ..... | 117,200 |
| Illinois | 327,940 | 335,200 | ..... | 325,625 |
| Kansas | 211,650 | 194,200 | 198,200 | 216,000 |
| Louisiana | 306,080 | 291,300 | 308,190 | 304,570 |
| *North Louisiana* | *70,830* | ..... | ..... | *70,520* |
| *Louisiana Gulf Coast* | *235,250* | ..... | ..... | *234,050* |
| Michigan | 37,900 | 47,700 | ..... | 37,945 |
| Mississippi | 17,730 | 20,300 | ..... | 18,435 |
| Nebraska | 3,950 | 3,200 | ..... | 3,850 |
| New Mexico | 110,980 | 103,900 | 110,000 | 110,990 |
| Oklahoma | 409,250 | 437,400 | 400,000 | 402,150 |
| Rocky Mountain states | 100,620 | 109,700 | ..... | 100,380 |
| Texas | 1,441,290 | 1,327,400 | 1,352,489 | 1,366,775 |
| *East Texas* | *445,000* | ..... | ..... | *374,375* |
| *West Texas* | *241,400* | ..... | ..... | *240,675* |
| *North Central Texas* | *132,250* | ..... | ..... | *132,100* |
| *East Central Texas* | *77,895* | ..... | ..... | *77,750* |
| *Texas Panhandle* | *77,445* | ..... | ..... | *77,525* |
| *Texas Gulf Coast* | *373,800* | ..... | ..... | *371,000* |
| *Southwest Texas* | *93,500* | ..... | ..... | *93,350* |
| Total United States | 3,762,680 | 3,655,500 | ..... | 3,685,380 |
| Total production, Jan. 1-Mar. 29, 1941 | | 291,290,130 bbl. | | |
| Same period last year | | 301,935,496 bbl. | | |

Many producers feel that the smallness of the increase assures that additional advances will become effective in the near future provided basic conditions in the industry are not disturbed through an unwarranted expansion in crude-oil production and refinery operations. Gasoline stocks at the start of April were approximately 3 million barrels under the same date last year with an even better situation for this year apparent when aviation-gasoline stocks are not considered. The statisticians are hopeful that the comparative inventory position will continue to improve so that on May 1 stocks of all gasolines will be at least 5 million barrels under May 1, 1940. If gasoline stocks are reduced to approximately 90 million barrels by early May, market students feel that with a 10 per cent increase in domestic demand, those inventories will not be burdensome and a satisfactory market will develop quickly.

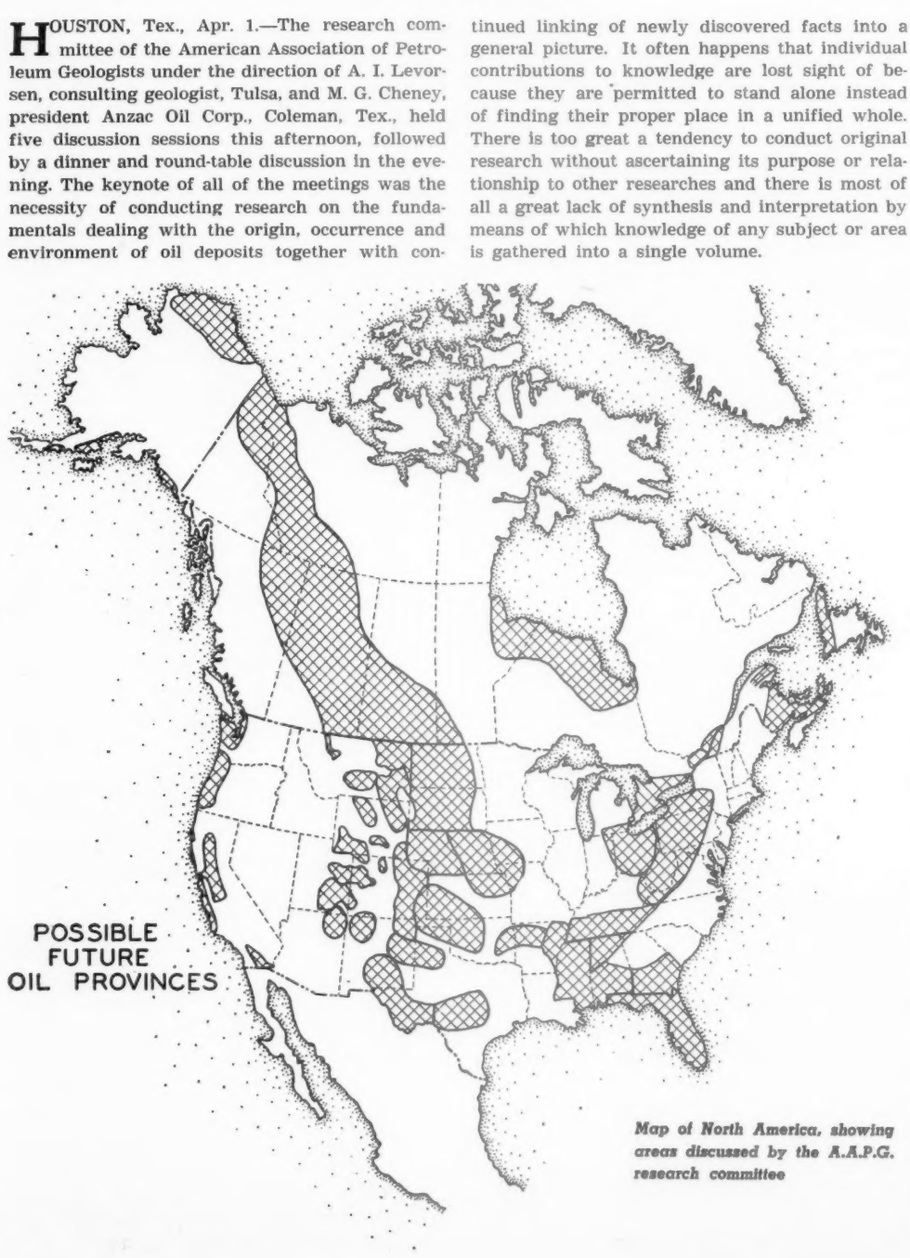


# Possible Oil Provinces Cover Wide Area . . . in U. S. and Canada

**Geologists assembled at Houston for the annual convention of the American Association of Petroleum Geologists, in a round-table discussion led by A. I. Levorsen, appraised the possibilities of undrilled regions. Here is the summary of some 40 papers, with a report of how the various committees compiled the data.**

By W. V. HOWARD

HOUSTON, Tex., Apr. 1.—The research committee of the American Association of Petroleum Geologists under the direction of A. I. Levorsen, consulting geologist, Tulsa, and M. G. Cheney, president Anzac Oil Corp., Coleman, Tex., held five discussion sessions this afternoon, followed by a dinner and round-table discussion in the evening. The keynote of all of the meetings was the necessity of conducting research on the fundamentals dealing with the origin, occurrence and environment of oil deposits together with continued linking of newly discovered facts into a general picture. It often happens that individual contributions to knowledge are lost sight of because they are permitted to stand alone instead of finding their proper place in a unified whole. There is too great a tendency to conduct original research without ascertaining its purpose or relationship to other researches and there is most of all a great lack of synthesis and interpretation by means of which knowledge of any subject or area is gathered into a single volume.




*Map of North America, showing areas discussed by the A.A.P.G. research committee*

The evening round table consisted of the presentation of some 40 papers dealing with "Possible Future Oil Provinces in the United States and Canada." In his opening remarks, Mr. Levorsen discussed the broader aspects of the problem and the methods adopted in the appraisal of each area.

According to the plan conceived by Mr. Levorsen, it is now necessary to appraise the oil possibilities of undrilled areas. These areas can be divided into two main classes: (1) Undrilled structures and untapped sands in areas now producing. These he considers as "probable reserves." (2) Areas which have possibilities for commercial oil accumulation but which are now nonproducing. These are referred to as "possible reserves." It is obviously impossible to obtain any group collaboration on the part of geologists employed by oil companies on "probable reserves," but it was felt that these men could pool their knowledge with regard to the nonproducing sections of the country.

### Collaboration of Local Societies

Local geological societies taking part in the study each appointed a committee consisting of seven geologists who prepared reports on the area on which it was decided to report. The U. S. Geological Survey prepared a study of several areas in Alaska and the Canadian Geological Survey prepared a discussion of eastern Canada. Other sections or societies participating were the Tulsa Geological Society; Rocky Mountain Association of Petroleum Geologists, Denver, Colo.; Mississippi Geological Society, Jackson, Miss.; West Texas Geological Society, Midland, Tex.; Appalachian Geological Society, Charleston, W. Va.; Alberta Geological Society, Calgary, Alta., and the Pacific Coast section of the A.A.P.G., Los Angeles, Calif.

Each participating group decided to discuss certain areas but it was specifically pointed out that areas omitted from the discussion are not necessarily condemned.

In estimating the possibilities of a region, no attempt could be made to place these possible reserves on a barrel basis. In order to secure uniform treatment, participating geologists were asked to consider each area on the basis of certain criteria. These are:

1. Sediments, their volume and nature. A section predominantly marine has greater possibilities for oil production than one with a large proportion of continental deposits. Also metamorphism of the sediments by heat or pressure or both reduces the possibilities of oil discovery. For purposes of this report, thicknesses of less than 1,000 ft. were not considered, nor were depths greater than present drilling limits of about 15,000 ft.

2. Evidence of oil and gas, seeps, etc. The occurrence of oil and gas seeps is always of great value in prospective areas in indicating that hydrocarbons are present. Practically all producing areas were first drilled on such evidence.

3. Unconformities or breaks in the section. Within recent years the importance of unconformities has been more and more stressed. Every break in the section, however small, indicates a

period when the rocks were subjected to erosion. This developed porosity locally and, at the same time, provided sand and other rock material which was deposited along the shore line forming possible stratigraphic traps. Then, too, structures below unconformities need not be reflected in later folding so that it is possible to find good structures at depths whose presence is not reflected at the surface. According to Mr. Levorsen, a strong unconformity may not double the possibilities of finding oil in an area, but the chances are, at least, nearly doubled.

On the negative side of the ledger, the presence of unconformities greatly increases the difficulty of finding oil below them. Geophysical measurements are confused below many breaks and subsurface geology is made more complicated. This handicap is by no means fatal but new exploration methods are needed to overcome it. Unconformities also make it necessary to check the area in which they occur much more closely before abandonment than where the section is unbroken.

4. Wedge belts of porosity. A glance at any map showing the position of oil fields will indicate the existence of belts of porosity. Locally, oil occurs on structures within these belts, but they may extend across country without much relation to major structural details. As examples the 50-mile-wide belt across Michigan, West Texas and the west side of the San Joaquin Valley may be cited.

### Reasons for Study

The principal reason for this study is, of course, the necessity of knowing as much as possible about the nation's oil reserves. Large additional reserves are not greatly needed at present. In fact, it would not be economic to develop new supplies much in excess of the present quantity. It is equally obvious that present reserves are not sufficient for a permanent supply of oil. Much will be found by deeper drilling or by more intensive prospecting in the producing districts, but eventually we shall have to move into new areas. As that time approaches, the efficiency with which prospecting is carried on is directly proportional to the amount of knowledge we have of the different areas in advance of drilling.

Much of our present fumbling is directly traceable to an incomplete knowledge of what constitutes a possible oil province. It is only a few years ago that many geologists considered that the presence of red beds or of salt condemned the underlying formations. Thus, there was no oil in West Texas. Some areas were formerly condemned on the basis of criteria now discarded but still remain unprospected. Knowledge gained in some areas is not applied to others. It has been found necessary in some areas to revise the restrictions imposed by the carbon-ratio theory. This has not been done in other areas. This nation-wide study should develop criteria of nation-wide application.

Finally, as geologists, the committees are interested in increasing employment for geologists, particularly for young men entering the profession. These men can get much valuable training in the unexplored areas.

### Eastern Canada and Newfoundland

The area to the southwest of Hudson's and James' Bay is underlain by Devonian, Silurian and Ordovician limestones. Very little of this area has over 1,000 ft. of sediments. There are two unconformities in the section and shows of oil and gas have been observed.

In eastern Ontario and the St. Lawrence lowland, the formations range from 1,000 to 2,100 ft. in thickness. They are of Ordovician and Cambrian ages. Shows of gas and oil have been found, but commercial production has not been developed.

In southwestern Ontario there has been oil and gas production for many years. The formations range from Ordovician to Devonian in age and most of the production has come from the higher formations. Thicknesses range up to 6,000 ft. Farther east, in Central Ontario, the section is mainly Ordovician. Shows have been found but no commercial production. The sediments wedge out against an old pre-Cambrian high.

Gaspe provides good possibilities for commercial production. There are large seeps in the area, which is underlain by several thousand feet of Devonian and older rocks. Approximately 60 wells were drilled over a period of 20 years prior to 1900, but these were badly located. At that shows of oil were found in the Lower Devonian and Upper Silurian of many wells.

There is some oil production in the Mississippian of New Brunswick, but this section is virtually unprospected. Formations are thick and there are strong unconformities in the section. In Nova Scotia, the sediments lie in narrow complexly folded basins. They range from Pennsylvanian downward. Some of the basins contain thick coal measures and a great thickness of sediments below. In Prince Edward Island, the surface formations are red beds and wells have been drilled to below 6,000 ft. without leaving the red sands and shales. Deeper possibilities are unknown.

The Newfoundland section resembles that of Nova Scotia although there is less Pennsylvanian exposed. Formations are complexly folded with strong faulting.

### Northeastern United States

The areas discussed by the Appalachian Geological Society have had production for many years, although most of it has been from the shallower formations. Deep drilling opens up large sections of the Pennsylvania-West Virginia basin to prospecting in formations below the present pays. Oriskany gas is produced at both the north and south ends of the area, although not in the central part. Below this is the Clinton which produces gas in eastern Ohio, and the Trenton and St. Peter are of unknown potentialities.

The northern end of the Cincinnati arch also has possibilities in formations below the regular pay which is the Trenton. This formation is found at depths of from 1,000 to 1,700 ft. The former area contains some 210,000 cu. miles of unprospected sediments and the latter 44,000 cu. miles.

*Chairmen of the various convention committees of the Houston Geological Society who arranged details of the annual convention of the American Association of Petroleum Geologists, at Houston this week. Seated, C. D. Lockwood, Texas Oil Report, chairman of publicity; J. A. Culbertson, Continental Oil Co., chairman of the field trip; George Sawtelle, president, Kirby Petroleum Co., chairman of entertainment; Alexander Deussen, consulting geologist, general chairman; Ben C. Belt, Gulf Oil Corp., chairman, finance; George Buchanan, Texas Gulf Producing Co., president of the Houston Geological Society; Wayne Bowman, consulting geologist, in charge of invitations. Standing: Carleton D. Speed, Jr., consulting geologist, chairman, reception committee; Olin Bell, Union Oil Co. of California, chairman of hotel and registration; Al Ferrando, Standard Oil Co. of Texas, chairman, golf committee; O. L. Brace, consulting geologist, in charge of development papers; Bill Clark, Schlumberger Well Surveying Corp., in charge of research laboratory tours; K. H. Crandell, Standard Oil Co. of Texas, chairman, transportation; T. I. Harkins, Independent Exploration Co., chairman of S.E.G. program committee; Perry Olcott, Humble Oil & Refining Co., chairman technical program committee; Wallace Thompson, General Crude Oil Co., member, steering committee; and Dr. Marcus Hanna, Gulf Oil Corp., S.E.P.M. general chairman*

### Southeastern United States

The Mississippi Geological Society's survey of this region shows 17,600 cu. miles of explorable sediments in Georgia, 128,000 cu. miles in Florida, 55,000 cu. miles in southern Alabama, 5,000 cu. miles in Northwest Alabama, 140,000 cu. miles in Mississippi and 35,000 cu. miles in Tennessee. Over most of the area Cretaceous and Tertiary sediments overlap one another and come in contact with the older rocks of the Piedmont, the Appalachians and the Nashville dome. The later sediments thicken towards the Gulf and the section is very similar to that of Louisiana and Texas.

The Northwest Alabama and northeastern Mis-

*(Continued on Page 120)*

Section featuring annual

GEOLOGICAL MEETINGS

Starts on Page 35

# SPARKS . . . FROM THE NEWS

**BETTER OUTLOOK:** Illinois politicians in increasing numbers are favoring home rule in oil in preference to federal control. Definite action in the Sucker State may be just around the corner.

**PIPE-LINE GOBS:** If the Navy follows through a recent congressional proposal the sailors will be in the pipe-line business in the southeastern United States on a large scale.

**BORING:** Dr. Wilson, the O.P.M.'s petroleum consultant, is an oil-company executive with a scientific background. His factual approach to every problem must be very boring to Washington politicians.

**STICK TO THEIR GUNS:** Army and Navy representatives stuck to their guns when the accuracy of their testimony before the Cole committee, showing the oil industry fully prepared to supply their petroleum requirements, was questioned.

**IT CAN HAPPEN:** An oil company operated 650 cars over 10,000,000 miles without a death or serious injury to its men or the public. A well-directed safety program is the explanation. Records of most oil companies are comparable.

**STRONG CASE:** Proponents of two-zone completions presented a strong conservation case before the Kansas Corporation Commission at Wichita Friday.

**GOING DOWN:** Michigan production hit a 4-year low last week. Some oil men are leaving the state while others are intensifying their prospecting campaigns.

**TIGHT:** A market authority with more than a quarter century of observation says the crude-oil and gasoline market in the Mid-Continent is the tightest it has been in several years.

**BREAKING DOWN:** The unexplainable Red River barrier to exploration between Texas and Oklahoma is breaking down and wildcatters are moving north into southeastern Oklahoma.

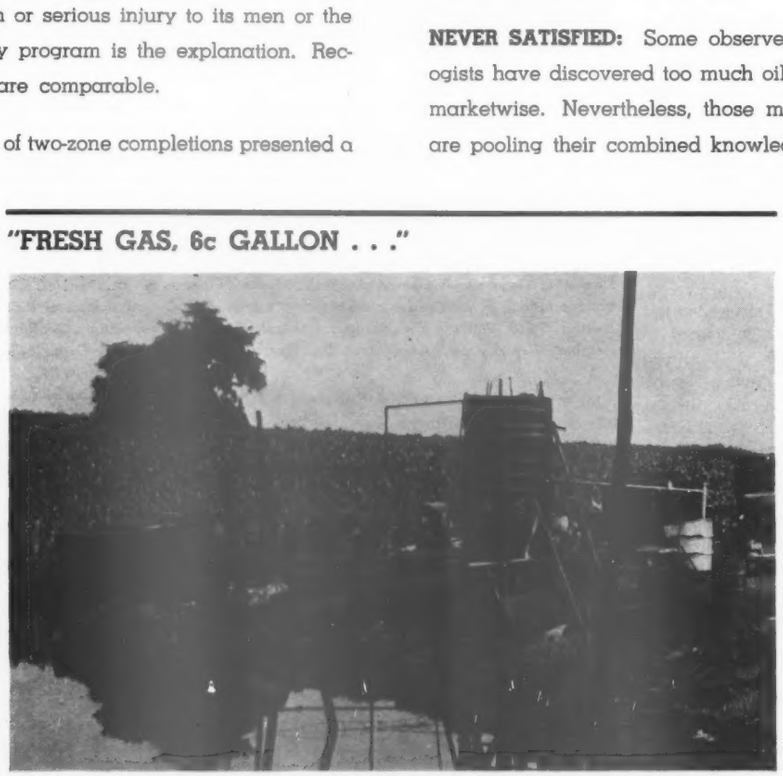
**NO QUARREL:** The long-awaited report of the monopoly (T.N.E.C.) committee recommended decentralization of economic and political power. The highly competitive oil industry has no quarrel with such a program.

**UNPRECEDENTED:** It has been so long since Mid-Continent and Gulf Coast producers had a crude advance that one of them referred to the original announcement last week as an "unprecedented action."

**DON'T JIBE:** Saturday, Texas was given a general crude-price advance and reports revealed the state's output for the week was 115,000 bbl. daily in excess of B. of M. recommendation. The two announcements don't jibe.

**NEVER SATISFIED:** Some observers might insist that the geologists have discovered too much oil for the good of the industry, marketwise. Nevertheless, those meeting at Houston this week are pooling their combined knowledge to find more.

## "FRESH GAS, 6c GALLON . . ."



***A small batch still operated by a group of negroes, located near Cave City, Ky. A large sign posted on the highway near the still advertises "Fresh Gas, 6 cents per gallon." Crude is brought to the still from nearby production, the wells averaging ½ to 1 bbl. per week. The operators of the still fled as the photographer approached to take this picture***

**SPRING:** Field reports reveal that this is the time of the year when an oil man's fancy turns to getting that wildcat started.

**APPRECIATION:** Drilling contractors have their problems. A greater appreciation of that fact by producers will prove beneficial to everyone.

**PRICE SHOCK:** A Mid-Continent broker who failed to find any distress gasoline at distress prices after calling 10 refiners, went home where he is slowly recovering.

# Mid-Continent and Texas Crude Prices Advanced 5 to 11 Cents

By H. STANLEY NORMAN

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**The crude-price advance applied to most Mid-Continent producing states this week means about $150,000 a day, or $4,500,000 a month, additional revenue for producers. The figures are based on a weighted average increase of 6 cents, applied to about 2,500,000 bbl. of daily production.**

•

CRUDE-PRICE advances of 5 to 11 cents per barrel were applied this week by leading purchasers to fields in Texas, Oklahoma, Kansas, New Mexico and Illinois that produce about 65 to 70 per cent of the nation's oil.

This first general swing in crude prices in nearly 2½ years, while not entirely unexpected, if judged strictly on the strength of raw material in recent weeks, came earlier than some anticipated. Record expansion in demand for refinery products and recent improvements in the tank-car markets present a combination of conditions influencing purchasers to solidify their connections. Indications that demand for petroleum products will increase 8 to 9 per cent and possibly 10 over the whole year place an unprecedented premium on assured supplies of crude.

The Texas price advance was inaugurated by Humble Oil & Refining Co., effective at 7 a.m., March 29. The higher postings by Humble provided an increase of 5 cents per barrel in East Texas, East Central Texas, West Central Texas, 10 cents in the Gulf Coast and 11 cents in Carson, Hutchinson and Wheeler counties in the Panhandle which were elevated to a par with Gray County crude. West Texas Permian basin crudes were advanced 7 cents.

Illinois crude was advanced 5 cents per barrel April 1 by Sohio Corp., purchasing unit of Standard Oil Co. of Ohio.

Standard Oil Co. (Indiana), crude-oil purchasing department, announced a 5-cent advance for all gravities April 1 in Oklahoma, Kansas and North Texas. The company met the Humble's higher postings in Gulf Coast fields where it is a purchaser.

Details of all schedules will not be available for a few days but there is assurance that the higher postings have more than sufficient momentum to make them general throughout the Mid-Continent.

Carter Oil Co., operating unit of Standard Oil Co. (New Jersey), met the Standard of Indiana advance in Oklahoma and the Sohio Corp. increase in the Louden field, Illinois.

Gulf Oil Corp. has met the advances in Oklahoma, Kansas and Texas and Skelly Oil Co. moved up 5 cents in Kansas.

Phillips Petroleum Co., large purchaser of Panhandle crude, has adopted the Humble gravity price scale in that district. By consolidating all Panhandle crudes in a single gravity table, purchasers limited the advance in Gray County to 6 cents while the maximum of 11 cents applied to Carson, Hutchinson and Wheeler counties, which previously had been penalized 5 cents.

Southern Minerals Corp. met higher postings in Jim Wells and Nueces counties, Texas.

Sinclair Prairie Oil Marketing Co. advanced Oklahoma, Kansas, Mexia and North Texas crudes 5 cents, retaining the range of gravities prevailing in its previous table. West Texas, Panhandle and Lea County, New Mexico, crudes were posted at 78 cents for 28° gravity scaling up to $1.02 for 40°-gravity oil. East Texas at $1.15; Long Lake, Anderson County, Texas, at $1.13, and Eddy County, New Mexico, at 83 cents were the flat prices posted by the company. Gulf Coast gravity tables were increased 10 cents.

The Texas Co. posted a flat price of $1.22 per barrel for Illinois basin crude, making this purchaser 2 cents above the other buyers in that area. The company met advances elsewhere with deviations confined to scope of the gravity tables.

Pan American Production Co. entered East Texas as a purchaser April 1, posting the higher flat price of $1.15 and at the same time raised Cayuga crude, Anderson County, Texas, to 85 cents.

Eastern Illinois and western Indiana crudes were advanced to $1.05 by Ohio Oil Co. Rock River crude was posted at $1.05 and Lance Creek, Wyoming, oil at 82 cents.

Pure Oil Co. advanced Oklahoma and Kansas crudes to a price of 83 cents for 25°-gravity crude and $1.15 for 40°-gravity oil, excepting the Cumberland field, which was unchanged at $1.02 flat price for all gravities. Sun Oil Co., Globe Oil & Refining Co. and Sunray Oil Co. were among others joining in the posting of higher crude prices in fields where crude is purchased.

Among other companies meeting Humble's higher postings in East Texas were American Liberty Oil Co., Gladewater Refining Co. and Talco Refining Co.

There are slight variations in the gravity schedules but the bulk of oil commands equal prices.

Barnsdall Refining Co. posted the same price as Humble for Heyser crude. In the Fagan, Mc-

**HUMBLE OIL & REFINING CO.**

(Effective 7 a.m., March 29, 1941)

| Gravity— | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| Below 20 | $.98 | $.96 | $.93 | $.88 | $.83 | ... | ... | $.60 | $.73 |
| 20-20.9 | 1.00 | .98 | .95 | .90 | .85 | ... | ... | .62 | .75 |
| 21-21.9 | 1.02 | 1.00 | .97 | .92 | .87 | ... | ... | .64 | .77 |
| 22-22.9 | 1.04 | 1.02 | .99 | .94 | .89 | ... | ... | .66 | .79 |
| 23-23.9 | 1.06 | 1.04 | 1.01 | .96 | .91 | ... | ... | .68 | .81 |
| 24-24.9 | 1.08 | 1.06 | 1.03 | .98 | .93 | ... | ... | .70 | .83 |
| 25 and above | ... | ... | ... | ... | ... | ... | ... | ... | .85 |
| 25-25.9 | 1.10 | 1.08 | 1.05 | 1.00 | .95 | $.87 | $.78 | .72 | ... |
| 26-26.9 | 1.12 | 1.10 | 1.07 | 1.02 | .97 | .89 | .80 | .74 | ... |
| 27-27.9 | 1.14 | 1.12 | 1.09 | 1.04 | .99 | .91 | .82 | .76 | ... |
| 28-28.9 | 1.16 | 1.14 | 1.11 | 1.06 | 1.01 | .93 | .84 | .78 | ... |
| 29-29.9 | 1.18 | 1.16 | 1.13 | 1.08 | 1.03 | .95 | .86 | .80 | ... |
| 30-30.9 | 1.20 | 1.18 | 1.15 | 1.10 | 1.05 | .97 | .88 | .82 | ... |
| 31-31.9 | 1.22 | 1.20 | 1.17 | 1.12 | 1.07 | .99 | .90 | .84 | ... |
| 32-32.9 | 1.24 | 1.22 | 1.19 | 1.14 | 1.09 | 1.01 | .92 | .86 | ... |
| 33-33.9 | 1.26 | 1.24 | 1.21 | 1.16 | 1.11 | 1.03 | .94 | .88 | ... |
| 34-34.9 | 1.28 | 1.26 | 1.23 | 1.18 | 1.13 | 1.05 | .96 | .90 | ... |
| 35-35.9 | 1.30 | 1.28 | 1.25 | 1.20 | 1.15 | 1.07 | .98 | .92 | ... |
| 36-36.9 | 1.32 | 1.30 | 1.27 | 1.22 | 1.17 | 1.09 | 1.00 | .94 | ... |
| 37-37.9 | 1.34 | 1.32 | 1.29 | 1.24 | 1.19 | 1.11 | 1.02 | .96 | ... |
| 38-38.9 | 1.36 | 1.34 | 1.31 | 1.26 | 1.21 | 1.13 | 1.04 | .98 | ... |
| 39-39.9 | 1.38 | 1.36 | 1.33 | 1.28 | 1.23 | 1.15 | 1.06 | 1.00 | ... |
| 40 and above | 1.40 | 1.38 | 1.35 | 1.30 | 1.25 | 1.17 | 1.08 | 1.02 | ... |

The above numbered columns include the crudes shown below:

Column 1—Refugio crude: Includes crude purchased in East White Point, Greta, Melon Creek, O'Connor-McFaddin, Plymouth, Saxet, Taft, and Tomoconnor fields.

Column 2—Texas Gulf Coast crude: Includes crude purchased in Amelia, Clear Lake, Goose Creek, Hastings, Magnet, Mykawa, Mykawa New, Raccoon Bend, South Thompsons, Sugarland, Thompsons, and Webster fields.

Column 3—Mirando crude: Includes crude purchased in Blanchard, Bridwell, Colorado, Comitas, Eagle Hill, Escobas, Fitzsimmons, Glen, Government Wells (North and South), Heyser, Hoffman, Kelsey, Kohler, Loma Novia, Lundell, Manila, Mirando Valley, Placedo, Randado, Sarnosa, and Tesoro fields.

Column 4—Includes crude purchased in Anahuac, Angleton, Cedar Point, Fishers' Reef, Hull (old and new), Pierce Junction, Red Fish Reef, and Turtle Bay fields.

Column 5—Includes crude purchased in Dickinson, Gillock, Hardin, League City, and Rowan fields.

Column 6—East Central Texas crude: Includes crude purchased in Anderson, Cherokee, Limestone, and Navarro counties and Navarro Crossing field.

Column 7—West Central Texas crude: Includes crude purchased in Brown, Callahan, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, and Throckmorton counties.

Column 8—Panhandle, West Texas, and New Mexico crude: Includes crude purchased in Carson, Gray, Hutchinson, and Wheeler counties; Andrews, Crane, Crockett, Ector, Gaines, Glasscock, Howard, Reagan, Upton, Winkler, and Yoakum counties, Texas; Lea County, New Mexico.

Column 9—Includes crude purchased in the Hawkins field, Wood County.

For crude purchased in the following fields:

| | |
|---|---|
| Conroe | $1.33 |
| Tomball | 1.30 |
| Alice, Benavides (North Sweden), Ben Bolt, Clark-Muil, Sun, and Tom Graham | 1.25 |
| Flour Bluff, East Flour Bluff | 1.23 |
| East Texas and Flag Lake | 1.15 |
| Salt Flat, North Salt Flat, Darst Creek, Hilbig, Carroll, Clark, and Zoboroski | 1.04 |
| Van | .98 |
| Yates (Pecos) | .85 |
| Talco | .72 |

**STANDARD OIL CO. (INDIANA) Oklahoma and Kansas**
**STANOLIND CRUDE OIL PURCHASING CO., Texas**

(Effective 7 a.m. April 1, 1941)

| Gravity— | Oklahoma and Kansas | North Texas | Fairbanks, No. Houston and Roslyn | Clinton |
|---|---|---|---|---|
| Below 20 | ... | ... | $0.83 | ... |
| Below 21 | $0.75 | $0.68 | .85 | $0.98 |
| 21-21.9 | .77 | .70 | .87 | 1.00 |
| 22-22.9 | .79 | .72 | .89 | 1.02 |
| 23-23.9 | .81 | .74 | .91 | 1.04 |
| 24-24.9 | .83 | .76 | .93 | 1.06 |
| 25-25.9 | .85 | .78 | .95 | 1.08 |
| 26-26.9 | .87 | .80 | .97 | 1.10 |
| 27-27.9 | .89 | .82 | .99 | 1.12 |
| 28-28.9 | .91 | .84 | 1.01 | 1.14 |
| 29-29.9 | .93 | .86 | 1.03 | 1.16 |
| 30-30.9 | .95 | .88 | 1.05 | 1.18 |
| 31-31.9 | .97 | .90 | 1.07 | 1.20 |
| 32-32.9 | .99 | .92 | 1.09 | 1.22 |
| 33-33.9 | 1.01 | .94 | 1.11 | 1.24 |
| 34-34.9 | 1.03 | .96 | 1.13 | 1.26 |
| 35-35.9 | 1.05 | .98 | 1.15 | 1.28 |
| 36-36.9 | 1.07 | 1.00 | 1.17 | 1.30 |
| 37-37.9 | 1.09 | 1.02 | 1.19 | 1.32 |
| 38-38.9 | 1.11 | 1.04 | 1.21 | 1.34 |
| 39-39.9 | 1.13 | 1.06 | 1.23 | 1.36 |
| 40 and over | 1.15 | 1.08 | 1.25 | 1.38 |

Satsuma and Tomball, flat $1.30.
East Texas, flat $1.15.

Faddin and Greta fields, the scale started at 98 cents for below 20° gravity and stopped at 28° gravity, making top price $1.16. East Placedo, Placedo, Keeran started at 93 cents for below 20° gravity and stopped at 28° gravity, making top price $1.11.

One of the most significant changes in policy reflected by Humble's new schedule is the grouping of Panhandle, West Texas and New Mexico crudes under a single gravity table starting at 60 cents for oil below 20° gravity and scaling up to $1.02 for 40° gravity and above. Previously, the Panhandle gravity table started at 28° gravity and crudes below that minimum commanded the lowest price in the table which was 72 cents in Gray County and 67 cents in the other counties.

# Oil Exploration Has Bright Future

By W. T. BORN
President, Society of Exploration Geophysicists

**In this article the author tells why he believes oil explorers can look ahead to an orderly and sound exploration program, rather than a frenzied and inefficient search for immediately needed oil. He feels that in that program, geophysical exploration will play an extremely important role.**

IN a very real sense the petroleum industry is, and has been, the custodian of an essential and irreplaceable natural resource. Although individuals and companies within that industry have made, and must inevitably continue to make, some mistakes, no one familiar with the facts can do other than admit that the industry as a whole has faithfully and efficiently performed that function. The oil business stands today in a position, shared by few other industries, of being able to meet with equanimity whatever immediate demands may be made upon it by reason of the present national-defense program and, at the same time, it can assure the nation that its future supply of petroleum is insured by a proven domestic reserve, larger now that at any time in the past.

In a broad way the interests of the petroleum industry and that of the nation are identical. In order to exist at all the industry must produce and sell petroleum products at a profit in a highly competitive market; but, what is even more important, its continued existence depends upon its ability to discover today the oil to be produced and sold tomorrow. While the profit motive is operative to encourage efficient operating practices and the avoidance of waste, the infinitely more potent instinct of self-preservation drives it to spare no effort in adding to its reserves by exploration work. An oil field forever undiscovered is of no value to the industry or to the nation; thus in seeking to insure its own survival, the industry is simultaneously doing that which is necessary if our country is to retain its present preeminent and independent position in a mechanized world.

Those of us connected with the exploratory activities of the industry must of necessity be more concerned with future possibilities than with present realities. It is well that our past efforts have been successful enough so that in the present situation we can look ahead to an orderly and sound exploration program in the future, rather than a frenzied and inefficient search for immediately needed oil. In that program the art of geophysical exploration will continue to play an extremely important role.

### Must Improve Techniques

It is obvious that the techniques of exploring for oil must continue to be improved and that the art of applying those techniques must continually advance if the future discovery rate is to be kept on a par with that of the present. Each prospect discovered is one less to be discovered, hence the search grows increasingly more difficult and some time must come to an end. The end, when it comes, will be at that time when all oil fields have been discovered or when no then-known technique is applicable to the finding of those fields remaining undiscovered. It is the writer's firm conviction that the art of exploration for oil and particularly that of geophysics will continue to advance so that the end point will be more nearly the former than the latter, and this without the necessity of resorting to profuse random wildcat drilling.

Several definite trends in the application of existing geophysical techniques are already established. As a result of continuous improvements the cost of all types of geophysical surveys has been reduced so that they may now be applied in areas where their use was formerly not economically justified. The development of the gravity meter and the consequent enormous reduction in cost of gravity surveys has permitted the rapid accumulation of gravity data over widespread areas. In this particular case the very rapidity with which data can be obtained is causing temporary difficulties in its utilization. The significance of gravity anomalies in many areas is still far from being completely understood. However, the data now being obtained will be available for use in the future when it is reasonable to expect that the causes of various types of gravity anomalies and their possible relationship to structure favorable to oil accumulation will become better understood.

### Seismic Surveying

The technique of seismic surveying is being now applied to the search for extremely small structures in cases where it would have previously been too expensive to use. During the past few years work in reexploring areas in Central Oklahoma has resulted in the discovery of numerous small fields which, in aggregate, represent a considerable addition to the reserves of that state. This type of work will continue. It is the writer's belief that the use of the seismic method will also be extended to the search for small structures at shallow depths with an inexpensive technique designed primarily for that purpose.

Many eminent geologists believe that the most prolific accumulations of oil remaining undiscovered are in stratigraphic traps having little or no structure associated therewith. The possible application of the seismic method to the problem of discovering such traps is consequently of great importance. Certainly the existing techniques can be of service in this connection. As geological information accumulates and geological thought advances, we can confidently expect that the possible existence of such traps in certain areas may be surmised. The seismic method can indicate in that area what slight structural anomalies are present. A slight nosing or other irregularity which would be disregarded if the search were aimed at a closed structure, should in this case warrant an exploratory well. It seems not only possible but very probable that many of the important oil fields of the future are already indicated on seismic contour maps of today. Courage will be required to drill on slight anomalies which present-day thought may consider to be meaningless, but those indicated by dependable data may reflect surprisingly prolific fields. Many of the recently discovered fields of the Gulf Coast, while not exactly stratigraphic traps, nevertheless have so little closure that the evidence of the seismic data showing what little structure there is may easily be dismissed by saying "it is too weak to drill." Actually the data show conditions as they are. Undoubtedly many other such structures will be found by careful detailed seismic surveys, carefully studied to properly evaluate the probable errors.

There are extensive areas in which the seismic method at present does not yield satisfactory results. In still other areas the use of the method is possible only at great cost. In that very fact lies a great possibility for the future. There are still problems to be solved, horizons to be extended. The solution of these problems will require extensive experimental work and fundamental research on the physical properties of the earth materials with which the geophysicist deals. Such work is being pursued in many quarters. It should definitely be expanded.

It is to be expected that some work will be done in the future with both electrical and magnetic methods of prospecting although the writer does not expect either of these methods to become of great importance in the search for oil. However, both may be of value in restricted areas where geological conditions are known to be favorable to their use. In the clearer recognition of such areas lies the best chance of improving the utilization of these methods.

### Expand Fundamental Research

The development of a direct method of locating oil remains an ever-present hope. The empirical tests of methods offering possibilities in this direction are being actively pressed, and will continue to be. Consideration of new methods again points to the necessity of expanding fundamental research on both geophysical and geological problems. As our understanding of the physical phenomena increases, new methods can be more quickly evaluated and empirical tests, always involving tremendous expense, can be reduced to a minimum. Should methods of locating oil directly be found, they may appear as a byproduct of work on the fundamental problems of the origin and accumulation of oil. Work on those problems is being, and should continue to be, actively pursued.

Although the geological and geophysical staffs of the oil industry have the finding of oil as their primary function, both can be of assistance in problems connected with the drilling of wells and the production of oil. The aid given by the geologist is already extensive, that of the geophysicist will become increasingly important. The knowledge of earth properties gained by both field and laboratory work and many of the techniques developed in exploratory work can and will be applied to problems outside that field.

If economic conditions permit the oil industry to function in the future as it has in the past, there is no reason to believe that its exploration activities will be curtailed, or that they will fail to yield satisfactory results.

# Cole Committee Told Oil Industry Fully Prepared

By HENRY D. RALPH

WASHINGTON, D. C., Mar. 31.—"If there is one industry in the United States which can take national defense in its stride it is the petroleum industry, and to impose federal control at a time when private enterprise is, or should be, at a premium would create a bottleneck where none exists now."

With that statement, proposals for federal control of the oil industry were disposed of by Dr. Robert E. Wilson, oil expert of the Office of Production Management, testifying here last week before the Cole committee. He was referring specifically to the recent report of the National Resources Planning Board which recommended immediate emergency control of the oil and gas industries in the name of national defense.

The view that national-defense needs do not require regulation of the oil industry was echoed by Army and Navy officers who followed Dr. Wilson at the hearings. All pointed out that estimates of military consumption of petroleum products amount to a small percentage of the industry's production capacity.

The only possible difficulty in the case of war would be supplying civilian requirements for oil along the Atlantic seaboard, Dr. Wilson testified, but the industry is taking steps to meet this situation and additional pipe lines will be built with private capital if difficulties in obtaining rights-of-way in certain states are removed.

The tone of the current hearings strongly suggests that the Cole committee will reject all proposals for federal control of the oil industry, including the Interior Department's plan for regulation of production and conservation as embodied in the bill introduced in Congress by Mr. Cole. Instead, it appears likely that the committee will recommend that the federal Government be represented officially on the Interstate Oil Compact Commission, and that pipe lines be given some sort of federal authorization to condemn rights-of-way.

### Current Hearings Probably the Last

The current series of hearings is probably the last before the committee makes its report on May 1, though it may make a quick visit to the Southeast to look into the pipe-line situation. In opening the hearings on Thursday, Rep. William P. Cole, Jr., of Maryland, chairman of the petroleum subcommittee of the House committee on interstate and foreign commerce, observed that hearings on the Cole bill itself were ended last spring and that the committee would have made a report during the last Congress had not President Roosevelt asked further consideration of national-defense aspects and the pipe-line situation. The reopened hearings deal with these two subjects only, and the Cole bill is not under discussion. The fact that the old Cole bill died with the last Congress and has not been reintroduced may indicate that Mr. Cole considers it a dead issue. Rep. Clarence F. Lea of California, chairman of the full committee, is himself filling the vacancy on the petroleum subcommittee left by the withdrawal of Rep. Herron Pearson of Tennessee, who is now serving on the aviation subcommittee.

Testifying in his official capacity as head of the petroleum unit of the materials branch of the production division of the O.P.M., Dr. Wilson read a prepared statement to the effect that the petroleum industry can meet all military and civilian needs without government funds or government regulation. At an executive session Thursday afternoon Dr. Wilson gave the committee confidential information on military and naval requirements for oil products, but in the open session he declared that wartime demands would be only 5 or 10 per cent above estimated demands for this year, and that the entire military and civilian consumption of petroleum by Germany and Italy and the occupied areas of Europe are only about 5 per cent of present United States production.

The committee seemed much impressed with Dr. Wilson's comparisons of European supplies and United States capacity, and asked him many questions about German oil supplies.

In explaining why national-defense considerations do not justify federal control of the oil industry, Dr. Wilson said:

"Incidentally, it might be pointed out that the entire military activities of Germany and Italy, plus the industrial and other activities of these countries and of the occupied areas of western Europe, are being carried on with an amount of petroleum plus synthetic products which is only about 5 per cent of our present domestic production."

Dr. Wilson, admitting that many of his estimates were based on guesswork and fragmentary information, discussed the subject substantially as follows:

The United States has 63 per cent of the world's production of crude petroleum, while Germany, Italy, Poland, Austria, Hungary, and northern France together have about 1 per cent, or 40,000 bbl. per day. Germany also has several synthetic processes which can make motor fuel where cost is no consideration, and at the outbreak of the war Germany's synthetic production was about 70,000 bbl. per day.

The peacetime consumption of Germany, Italy,

## HIGHLIGHTS OF TESTIMONY BEFORE COMMITTEE

**PLEAS by some Washington agencies and officials for federal control of the petroleum industry to insure supplies in the defense program were shown to be almost ridiculous by testimony before the Cole committee last week and this.**

**Three highlights of testimony by Dr. Robert E. Wilson were:**

**1. The industry could increase crude-oil production 30 per cent and sustain the higher rate for 2 years without additional new fields.**

**2. The industry has 25 per cent more refining capacity in reserve that could be placed in service promptly or on reasonably short notice.**

**3. There is no justification for spending government funds to construct pipe-line facilities to the East Coast when private industry is capable of doing the work when, and if, the need arises.**

**Maj. Clifford V. Morgan, representing the War Department, testified that military requirements are only about 10 per cent of the total domestic supply, amounting last year to 125,000,000 bbl. He gave a breakdown of military consumption.**

**Combined air forces of the Army and Navy will require 24,400 bbl. daily of 100-octane gasoline when the present expansion program is completed, testified Maj. D. B. Lingle of the Army-Navy Aeronautical Board. The industry can more than meet this quota from operating plants, those under construction, and others now being designed and contemplated.**

**Tone of the hearings suggests that the Cole committee will reject all proposals for federal control. Indications are that federal representation on the Interstate Oil Compact Commission will be proposed and that some provision will be initiated to enable pipe lines to condemn rights-of-way.**

**Recommendations of the National Resources Planning Board for economic control of the petroleum industry drew the special criticism of J. C. Hunter, who represented the Interstate Compact Commission before the Cole group. He pointed out that the states are now doing everything proposed by federal-control proponents.**

**Rear Admiral Stuart said Pacific Coast supplies are adequate for any emergency.**

and the occupied areas of Europe was about 400,000 bbl. per day. Total petroleum products from all sources for those areas is now only about 180,000 bbl. per day.

This estimate includes 40,000 to 45,000 bbl. from local crude, but the fields are settled and scattered and probably have not been able to increase output substantially, though they are relatively free from bombing damage with the possible exception of those in Albania. Germany had plans to produce 100,000 bbl. per day in synthetic plants but these plants have been heavily bombed and their production probably does not exceed 70,000 or 75,000 bbl. daily. U.S.S.R. imports do not amount to much because of the long haul and difference in railway gages, and probably have not averaged more than 20,000 bbl. per day. Reports are that these shipments have ceased since German occupation of Bulgaria. Rumania is the largest potential source; it had a daily production of 125,000 bbl. when occupied but this has declined since because of the earthquake or shipping difficulties. Rumania formerly used about 40,000 bbl. per day and half its exports were by water. Germany advertised an agreement to obtain 60,000 bbl. per day but probably has not averaged more than 30,000 bbl. and will not obtain more than 45,000 bbl. per day during 1941, and some of this must be sent to Italy.

Germany's supply is thus about 40 per cent of her peacetime demand, so civilian use has been cut to the absolute minimum, but there probably is no shortage for military uses. The synthetic plants can make aviation fuel as well as motor gasoline so the German air force has an ample supply provided it can get the gasoline to the landing fields.

While Germany probably has around 25,000 military planes she has never had more than 2,000 or 3,000 in the air for more than a few days at a time. The probable explanation is that to keep half its air force in the air an average of 5 hours per day would require 7,000,000 gal. of gasoline per day, and this is a terrific supply problem since the airports are scattered from Norway to southern France and Europe does not have oil-distribution facilities comparable to those in the United States. Airport storage and supply facilities may have been improved during the winter.

Germany probably is very short of lubricants, since these cannot be synthesized and suitable crudes are not available in substantial quantities. Some German airplanes shot down in England show that the lubricating oil has been used much longer than is considered good practice in this country, and there are reports that elevators in many German buildings have been closed for lack of lubricants.

### Disagrees With Report

Recommendations for federal control of the oil industry made by the National Resources Planning Board were placed in the record by Chairman Cole, and the witness was asked to comment.

There is no dispute with the opening statement of the report that petroleum products are absolutely essential to national defense, Dr. Wilson replied, but beyond that he could not agree with the report. From his knowledge of the oil industry, he said, the regulatory steps recommended are certainly not needed now. Taking up the various recommendations, he pointed out that production is now allocated among the states by the monthly demand forecasts of the Bureau of Mines which are followed by the states in general. The Resources Board apparently overlooked the fact that there already is a federal oil-conservation agency in the Interior Department, he said, though he added that the board may contemplate something more drastic. He disputed the board's statement that estimates of requirements should be made for emergency purposes, explaining that such estimates are up to date and include all possible defense needs.

Chairman Cole called attention to the fact that Illinois has no conservation law, and Dr. Wilson replied that it is unfortunate both for the state and the nation that resources are dissipated but that while some oil was wasted in Illinois most of the waste was of capital and labor in unnecessary drilling and construction of refining capacity. He added that prospects are encouraging for enactment of conservation legislation in Illinois and that state is already past the point where it is a major disturbance to the industry in general and is entering a period of declining production.

Turning to the pipe-line situation, Chairman Cole referred to a resolution introduced in the House last week by Rep. Carl Vinson of Georgia, chairman of the committee on naval affairs, requesting the secretary of the Navy to investigate the need and practicability of construction of government-owned and operated fuel-oil pipe lines between Baton Rouge, La., Port St. Joe, Fla., and national-defense activities along the South Atlantic seaboard.

Dr. Wilson replied that in his understanding such a study already had been made. He said that last August the secretary of the Navy inquired about the possibility of constructing a fuel-oil line to Norfolk, Va., for Navy use and that he had made a report on the project which has since been studied by the Navy Department.

There is no justification for spending government funds to construct facilities to serve civilian needs, such as a pipe line, Dr. Wilson declared, adding that in case of naval operations in the Atlantic the tanker fleet could keep the Navy supplied with oil. Under such conditions the railroads would be unable to handle the volume of oil traffic needed for civilian use along the Atlantic seaboard, but Dr. Wilson said he has advised the oil industry to relieve this potential bottleneck by constructing new tankers, barges and pipe lines, and additional storage space. Some steps have already been taken, he said, including consideration by the industry of the economic feasibility of a crude pipe line from the St. Louis area to Marcus Hook, Pa.

Turning to the interstate compact, which must be renewed this year, Chairman Cole asked whether the federal Government should not be represented on the Compact Commission, and Dr. Wilson said this would be desirable but he would not want to see the compact jeopardized by insistence on this point.

Representative Lea asked whether a certificate from some federal agency should be required before a new pipe line is constructed in case Congress gives pipe lines the right of eminent domain. Dr. Wilson replied that one interstate common carrier should not be allowed to prevent the construction of another carrier but that there probably would be no objection to supervision of the use of condemnation powers of pipe lines, if granted, provided this does not result in lengthy delays which would be serious in the case of a crude-oil line needed to take oil from a newly developed field.

# Major Morgan Says Military Needs 10 Per Cent of Supply

Opening the Friday session, Maj. Clifford V. Morgan, representing the War Department, declared that from a military viewpoint the Army has little interest in either federal oil control or in a southeast pipe line.

As support for his stand, he gave the committee a detailed list of Army and Navy requirements for petroleum products, excluding aviation gas, as compared with the 1940 national production. His conclusion was that of the 1940 production of 1,352,000,000 bbl. of crude oil, the Army and Navy required about 125,000,000 bbl., or 10 per cent, whereas the Army alone needed about 25,000,000 bbl., or 2 per cent. Major Morgan emphasized he was giving only approximate figures, secured from the Army and Navy supply services, and told the committee that he had included the anticipated need, even during wartime.

Major Morgan's figures were as follows:

1. *Motor gasoline.*—1940 production, 616,000,000 bbl.; Army and Navy requirements, 26,000,000; Army requirements, 20,000,000 bbl.

2. *Diesel oils.*—1940 production, 183,000,000 bbl.; Army and Navy requirements, 3,000,000 bbl.; Army requirements, slightly over 500,000 bbl.

3. *Heavy fuel oils.*—1940 production, 316,000,000 bbl.; Army and Navy requirements, 100,000,000 bbl.; Army requirements, 3,000,000 bbl.

4. *Lubricants.*—1940 production, 37,000,000 bbl.; Army and Navy requirements, slightly over 1,000,000 bbl.; Army requirements, less than 1,000,000 bbl.

5. *Kerosene.*—1940 production, 74,000,000 bbl.; Army and Navy requirements, 150,000 bbl.; Army requirements, 62,000 bbl.

Since the Army needs only 2 per cent of the total national production, from a strategic standpoint its views have little bearing on the case, he maintained.

Asked by Chairman Cole for his opinion of the southeast pipe-line problem, Major Morgan declared that from a military viewpoint again, the Army is not interested either way. He told the committee that about 10 per cent of the armed forces are located in the southeast area, which would make them dependent on only two-tenths of 1 per cent of national oil production.

Chairman Cole asked whether these figures included any considerations for increased national-defense needs or additional lease-lend material. Major Morgan repeated that the figures represented strictly American military needs, and nothing else.

Obviously nettled, Chairman Cole then demanded to know whether the witness was speaking for himself or for Secretary Stimson. When told he was speaking for himself, the chairman insisted that he should be presenting the views of the War Department, and added that his testimony was in direct contradiction to the expressed statements of Secretary Stimson and President Roosevelt.

Major Morgan admitted not having seen President Roosevelt's letter on the Georgia pipe-line situation, and stated he had not conferred with Secretary Stimson on his appearance before the committee.

Chairman Cole then had Major Morgan read Secretary Stimson's letter on the need for a southeastern pipe line. After reading it, and admitting he had not seen it before, he said: "If this is the secretary of war's opinion, I don't think I have

anything further to offer. I was not informed of this before." He said his only purpose was to present a comparison of military needs with civilian needs.

Chairman Cole then informed the witness that testimony from other sources revealed that the Army and Navy required 20 per cent of the national production, and not 10 per cent as he had stated.

Major Morgan answered that he was quoting the figures of the Army and Navy supply services and had never seen the 20 per cent figure before. Representative Cole then asked him to read Secretary Stimson's letter on the estimation of military oil needs. He did, and pointed out that the secretary's precise words were "less than 20 per cent."

Chairman Cole responded in a perplexed manner that he still did not know whether Major Morgan agreed or disagreed with Secretary Stimson's advocacy of a Georgia pipe line.

Stating "I have no right to disagree with these (Stimson's) statements," Major Morgan declared he did not know the data behind the Stimson letter, and therefore could not criticize any further.

### Service Planes' Fuel Requirements

Brief testimony on aviation-gasoline needs then was presented by Maj. D. G. Lingle, Army Air Corps, now on duty with the joint Army-Navy Aeronautical Board.

Major Lingle declared that at the end of the present expansion program, the requirements for 100-octane gas will be 24,000 bbl. per day. He said the breakdown of these figures was highly confidential, and he could not elaborate in a public session. The committee agreed, and did not press the witness further.

Rear Admr. H. A. Stuart, director of naval petroleum reserves, rounded out the testimony for the armed forces. Admiral Stuart declared he had nothing further to add to his statement of November 1939, in which he opposed federal oil control, and read a subsequent letter from Undersecretary of the Navy Forrestal in which Stuart's position was reaffirmed as the stand of the Navy Department.

Chairman Cole asked whether the present emergency had in any way changed the situation, and the answer was that it had not changed materially.

As to pipe lines, the witness stated he agreed with the position taken by Secretary Knox that the building of a southeast pipe line by private capital may not be entirely necessary but is desirable for the national defense.

Chairman Cole asked whether there would be a sufficient supply of petroleum on the Pacific Coast to meet all wartime requirements, including the Philippines and Hawaii, with the Panama Canal out of commission. Mr. Stuart answered there would be an increased dependence on tankers, but that there was no question in his mind that there would easily be a sufficient oil supply. He pointed out, though, that there might be some curtailment of civilian oil supplies during wartime.

### Hunter Denies Charge of Waste

Last witness of the day was J. C. Hunter, of Abilene, Tex., appearing for the Interstate Oil Compact Commission, of which he is the Texas representative. In a 20-page statement he summarized the achievements and activities of the commission, described the encouraging spread of conservation and oil-compact laws, and upheld the right of the states to control their own oil resources. He supported the previous testimony of Dr. Wilson, and stated Dr. Wilson's findings were confirmed by the studies made by the commission.

Reiterating the ability of the individual states to govern the oil industry, and decrying the charge of waste, Mr. Hunter proclaimed his disagreement with the recent recommendations for federal oil control. He said:

"There has been placed in your record a report by the National Resources Planning Board proposing a federal administrative agency to control and regulate by authority of law the conservation and economy of petroleum production. Price control and the fixing of production quotas, as well as the regulation of the use of petroleum products, is also recommended. Price control and price fixing, as well as the designation of preferred uses of petroleum products, are properly beyond the scope and powers of the compact. No need has yet arisen, nor can we visualize any need, for such economic control with respect to petroleum resources. It has been the office of the compact to furnish a forum through which the states themselves are accomplishing every desirable proposal for the prevention of waste made by the National Resources Planning Board."

After his presentation, Mr. Hunter invited the committee to attend the April meeting of the commission in New Orleans some time during the week of the fourteenth, and stated the date would be set to accommodate the committee. Chairman Cole indicated the committee would probably attend the meeting after the hearings are over. He stated Governor Jones of Louisiana had expressly asked him to visit the state to study Louisiana conservation laws. Whether the committee will study the pipe-line situation on the trip also, depends on the scope of the testimony presented next week, he said.

The committee reconvened Tuesday and the rest of the week was to be devoted to the pipeline situation. It is intended that hearings will be concluded on Friday. The committee report to Congress is due May 1, and Chairman Cole said he will not ask for another postponement.

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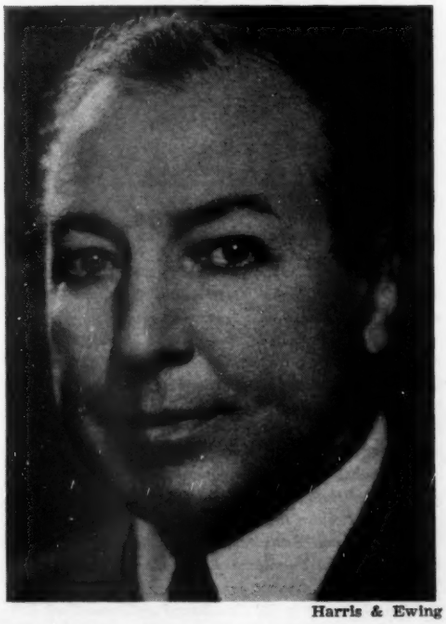
# Wilson Reviews Mechanization Program Before Geologists

THE combination of petroleum and this country's ability to mass-produce war machines will give the nation a flexible defense system better than several Maginot lines, declared Dr. R. E. Wilson in a paper presented this week before the annual meeting of the American Association of Petroleum Geologists.

Some of the ground covered by Dr. Wilson before the geologists was brought out in his testimony last week before the Cole committee at Washington, D. C., where he appeared as technical adviser on petroleum to the Office of Production Management.

Excerpts from the Houston address follow:

IN addressing an audience such as this, it is hardly necessary to stress the importance of petroleum in modern mechanized war — in fact, while it is hardly possible to overemphasize this importance, any spokesman for the industry should couple any such emphasis with a factual picture of the industry's ability to meet all this country's needs. Otherwise, there is a tendency to stimulate unwarranted fears of shortage and unnecessary proposals for additional control or regulation of the industry.



Harris & Ewing

***REP. PEHR G. HOLMES, of Massachusetts, member of the Cole committee***

### Our Program of Mechanization

All of us are generally familiar with the rapidly expanding program of our Navy, culminating in a real two-ocean navy of unmatched fighting power which will be almost entirely dependent upon fuel oils from petroleum as its driving force. The spectacular development now under way for our air services is also well known, and all new fighting planes are designed to take advantage of synthetic superfuels not even dreamed of a few years ago. Military-plane production in this country is now over 1,000 units per month and this will be almost doubled by this summer, and trebled by the next spring. What this really means can best be pointed out by the fact that our commercial air lines, of whose development we are justly proud, has a total of less than 400 planes in service.

Less fully appreciated is the tremendous program being undertaken looking toward the mechanization of our land forces. Although our rather late start in this direction has its disadvantages, it has permitted us to take advantage of the most recent technical developments and the latest experience from abroad. Once our tremendous mass production facilities are brought into action, we shall be building a quality and quantity of tanks, trucks, and armored cars which will amaze the world. If land defense of this country should ever become necessary, this equipment, using our unequaled system of highways and our widespread and efficient gasoline-distributing system, will give the nation a flexible defense system better than several Maginot lines.

General Barzynski, who is in charge of motor transport for the quartermaster, recently stated that a year ago they had only 14,000 vehicles; today they are maintaining approximately 75,000

*(Continued on Page 121)*

# STATE CAPITALS...

## OKLAHOMA

THE CORPORATION COMMISSION this week announced the April allowable would be 400,000 bbl. a day, the same as was set for the preceding 2 months but 29.300 bbl. under the Bureau of Mines estimate of demand.

Proration was lifted entirely in five old fields and no new fields were included in the order. The two new pools considered by the commission, the Guthrie pool in Logan County and the West Okemah area in Okfuskee County, were both allowed to produce and run their 15,000 bbl. of unprorated "discovery rights" oil before they will be limited.

The five pools taken off proration were South Konawa, with 460 bbl. a day production; East Seminole, 975 bbl.; Dora, 1,300 bbl.; Fox-deep, 150 bbl., and Fox-Hunton, 260 bbl.

Other adjustments included in the order were based on recommendations of Joe J. O'Loughlin, assistant conservation officer. Avoca was increased from 950 to 1,375 bbl., Coyle from 3,500 to 4,000 bbl., East Cromwell from 2,000 to 3,000 bbl., Cumberland from 6,000 to 6,500 bbl., Dill from 4,500 to 7,000 bbl., and North Shawnee from 375 to 500 bbl.

The Oklahoma City-Wilcox zone was reduced from 79,884 to 78,000 bbl., the first reduction in about a year. Other cuts were made at Edmond, the Fish pools, Sacred Heart, Shawnee, St. Louis, Oklahoma City-Simpson and Oklahoma City-Pawhuska.

The 24 pools in Class B had allowable of 56,923 bbl. in March and were cut to 53,979 bbl. for 22 fields for April. The four zones in Fitts field, comprising Class D were left unchanged at 13,000 bbl.; five fields in Class D were increased from 785 to 860 bbl.

Twenty-six pools in the unclassified group having allowable of 62,737 bbl. in March, were increased to 66,745 bbl. with 24 fields for April. Allowable for prorated areas for April was fixed at 212,584 bbl., comparing with 213,329 bbl. in March; the unprorated areas were increased from 186,671 to 187,416 bbl.

## TEXAS

CRUDE-OIL PRODUCTION of 1,373,359 bbl. daily in April was fixed by the Railroad Commission last week, an increase of 20,870 bbl. over March.

Four shutdown days for the Panhandle, nine for East Texas and 10 for the rest of the state were ordered by the commission in April. This was a change only for the Panhandle, which had 5 shutdown days in March. Shutdown days by districts, are:

Panhandle: April 6, 13, 26 and 30; East Texas: April 5, 6, 12, 13, 19, 20, 26, 27 and 30; others: same as East Texas with addition of April 9.

The new allowable is 30,009 bbl. daily below the Bureau of Mines estimated demand which was 1,355,300 bbl.

Allowables of the Hamman and Old Ocean fields, about which there has been much controversy, were not changed pending outcome of litigation and engineering tests.

As of April 1 the Hamman allowable is 3,254 bbl. daily and the Old Ocean 19,058 bbl.

The New Hawkins field was given the same allowable of 375 bbl.

The Rodessa field on the Louisiana-Arkansas border lost 325 bbl., its allowable being set at 17,548 bbl.

Talco gained 638, receiving an allowable of 23,777 bbl.

Big Lake was unchanged at 5,680 bbl. and McCamey was cut 54 bbl. for an allowable of 13,953 bbl.

Foster gained 578 bbl. for an allowable of 15,428 bbl., Goldsmith was upped 1,511 bbl. for an allowable of 32,022 bbl., McElroy gained 130 bbl. with an allowable of 18,626 bbl., Yates was increased 4,414 bbl. to make an 18,626 bbl., Yates was increased 4,414 bbl. to make an allowable of 22,007 bbl. and Wasson was boosted 4,312 bbl., with an allowable of 48,789 bbl.

The K.M.A. allowable was increased 689 bbl. to 32,276 bbl., and K.M.A. (Ellenburger) 140 bbl. to 380 bbl.

Young gained 286 bbl. for an allowable of 9,880 bbl.

SPECIAL HEARINGS set for the early part of April by the Railroad Commission include the following:

April 3.—Exemption from shutdowns for Lancaster 1 fee, White & Baker field, Pecos County, and for additional allowable and exemption from shutdowns on the discovery well and rules for the Carlile field, Stonewall County, by application of Leader Oil Co.

April 4.—Amendment of tolerance and allocation rules in the Avoca and Griffin fields, Jones County, requested by Iron Mountain Oil Co.; for shutdown exemption asked for Rotan field, Fisher County, by Lewis Production Co.

April 5.—Determining allowables for the Nichols field, Hidalgo County.

April 7.—For shutdown exemption request made for Pitzer & West 1 Manford, Manford field, Guadalupe County.

April 10.—Application of Kemrow Co. to use water to repressure its Burnett lease in the H.T.&B. Survey 6, Wichita County; for allowable increase asked for Herbert Oil Corp. 1 J. H. Caton, Section 5-5, T.&P. Survey, Stephens County.

FLOOR CONSIDERATION of the condensate-proration bill was assured last week after the proposed legislation was given a favorable report by the senate oil and gas committee. Senator Shivers of Port Arthur, Tex., chairman of the committee, cast an affirmative vote to break a tie. Enactment of the bill would subject condensate-producing wells to regulations like those applying to crude-oil producers and indirectly affect production by recycling plants.

### ILLINOIS COMPACTER . . .

*CLARENCE T. SMITH, of Flora, is slated to be named Illinois' member of the Interstate Oil Compact Commission by Gov. Dwight H. Green.*

*His appointment will be announced when the state senate approves a bill calling for a 2-year extension of Illinois membership in the compact body. The bill has been passed without opposition by the house of representatives and on March 27 the measure was reported favorably for passage in the upper house.*

*Mr. Smith has taken an outstanding part in development of the state's oil industry following new development in 1937. Since that time he has served as president of the Petroleum Association of Illinois and director of the Independent Petroleum Association of America for Illinois. He is at present general counsel for the Illinois division of the Pure Oil Co., Benedum-Trees, Carl Robinson, Rock Hill Oil Co., Smokey Oil Co., Schaffer, Parker and Toler, and others*

## KANSAS

ALLOWABLE PRODUCTION in April was fixed at 210,700 bbl. daily when the Corporation Commission followed the recommendations of Theo A. Morgan, conservation director. The April allowable is 12,500 bbl. daily higher than authorized in March and is the highest in the state's oil history. Existing wells in Kansas were assigned 204,700 bbl. of the daily allowable and 6,000 bbl. of the total is reserved for new completions anticipated during the month.

The Bureau of Mines estimated April demand for Kansas crude oil at 200,700 bbl. daily.

Potential production of Kansas crude increased 124,905 bbl. a day in March. In a recent survey, Kansas had 6,305 prorated wells and 14,615 nonprorated wells.

## PENNSYLVANIA

A BILL TO REGULATE location and abandonment of oil and gas wells has been introduced in the house by Assemblymen Harry P. O'Neill and C. O. Williams. It has been referred to committee.

While the bulk of the measure relates to location, drilling, plugging and abandonment of wells on lands underlain by coal beds, it also provides that the mine inspectors shall exercise general supervision over the drilling and abandoning of all wells drilled in the state for oil and gas. Well operators are also required to give proof of financial ability to properly case and plug wells in accordance with the requirements of the act.

It is understood that the measure is similar to one introduced, but not passed, by the assembly several years ago.

## ILLINOIS

TAXATION OF THE ILLINOIS oil industry and regulation of production are being considered by the state administration, Gov. Dwight H. Green announced in a press conference March 27.

The governor said he has counseled with advisers on possibility of preparing a measure calling for a tax of 3⅛ per cent of the value of each barrel of Illinois oil. Revenue to be derived from the proposal, he said, would be used for relief purposes and for possible reduction of the state sales tax from 3 to 2 per cent.

Although the executive and administration leaders declined to comment, it was admitted in official circles full endorsement will be given a regulatory bill reported ready for introduction in the legislature within the next 10 days. A press survey of legislators and representatives of the Illinois oil industry has revealed striking unanimity of desire for "home rule" legislation in preference to federal-control measures. For the first time since petroleum came to the front as a political issue in 1937 the majority of major and independent operators appear to be agreed on necessity for prompt enactment of a regulatory bill. Such action has been precluded in the last 4 years by strong opposition from "pressure groups"—which are now generally inactive—and fear on the part of legislators in the face of impending legislative election contests.

The OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

Published weekly by The Petroleum Publishing Company at Tulsa, Oklahoma

# Salute the Explorers

Last week testimony was presented to the Cole committee which should convince the most skeptical that the petroleum industry is prepared to cope with any possible emergency with adequate oil supplies.

This week at Houston the geological explorers and scientists who are largely responsible for this achievement are assembled in their annual meetings reviewing the past and coordinating the work through which the future oil supplies will be found.

Dr. Robert E. Wilson, petroleum consultant of the Office of Production Management, left nothing to the imagination as he made clear to the Cole committee and to his listeners at Houston, that the oil business has the reserves and production facilities to meet all needs.

Coming from the industry and with many months of special work at Washington, Dr. Wilson spoke authoritatively when he concluded: "The petroleum industry will continue to be able to supply every foreseeable military demand for petroleum without requiring any government funds or advance government contracts."

Factual-minded representatives of the Army and Navy appearing before the Cole committee in presenting the results of their investigations also revealed that the increased defense or possible war requirements for petroleum would be but a small part of the assured production in this country.

Pertinent to the Houston meetings, one is reminded that the oil industry cannot produce oil before it is found. Nor can it find it without the exercise of painstaking ingenuity on the part of those who direct the search.

The program of the American Association of Petroleum Geologists and its affiliated sister organizations was not planned with any particular crisis in mind. The vision of leaders in the exploration branches started their organizations on a plan of developing and disseminating vital information long before any of the factors causing the present emergency were known. They were planning for the peacetime development of the oil industry and early realized that it was necessary for them to keep far ahead of expanding requirements.

The scientific achievements of the geologists and geophysicists have enabled the driller to find the greatest reserves of oil in the nation's history. They did not coast along with just enough until the heat was on and then form committees which scrambled about in a frantic search for more supplies. They developed the reserves in advance of current needs.

The orderly development of the research programs of these organizations has led them naturally at this time to the discussion of several hundred thousand square miles of virtually untested territory. Probable reserves in undrilled parts of the producing areas are greater than those now in sight but the exploration departments know that they are going to have to branch out into new areas eventually. They are studying these areas today.

They know that new methods must be used in prospecting these areas and the geophysicists and geochemists are helping the geologists devise these methods. We do not see one department working alone without reference to or consultation with another. There is a greater amount of collaboration in exploration now than ever before.

All this is a governing factor which enabled Dr. Wilson to answer an inquiry from Chairman Cole as to the desirability of federal control with the statement: "If we have one industry that can take national defense in stride without calling on the Government for aid, it is the petroleum industry. To impose a superregulation on such an industry, at a time when individual enterprise should be at a premium, might easily constitute a bottleneck rather than an approach of what we need during the coming critical months."

# Operators Propose Two-Zone Rule for Western Kansas

WICHITA, Kans., Mar. 31.—More complete utilization of reserves, lower lease-development costs, and operation of marginal prospects are expected to follow adoption of a proposed rule on two-zone oil-well completions in western Kansas.

Testifying before the monthly proration hearing of the Kansas Corporation Commission in Wichita this week, A. S. Ritchie, Wichita, of McPherson Drilling Co., told Arnold Jones, presiding chairman, and Samuel Bartlett, commissioner, that the proposal, if granted, would "develop oil reserves that, otherwise, would be lost. It has a very definite angle on conservation."

Mr. Ritchie, the first of a group of six witnesses who appeared following the regular market-demand hearing, said that the plan was the installation of a nonremovable packer of drillable material to be installed in the well casing between the two zones from which production is desired. A string of tubing, with one set of perforations, is inserted, and production may be obtained from either zone at will by merely raising or lowering the tubing so that the perforated portion is set opposite the producing zone.

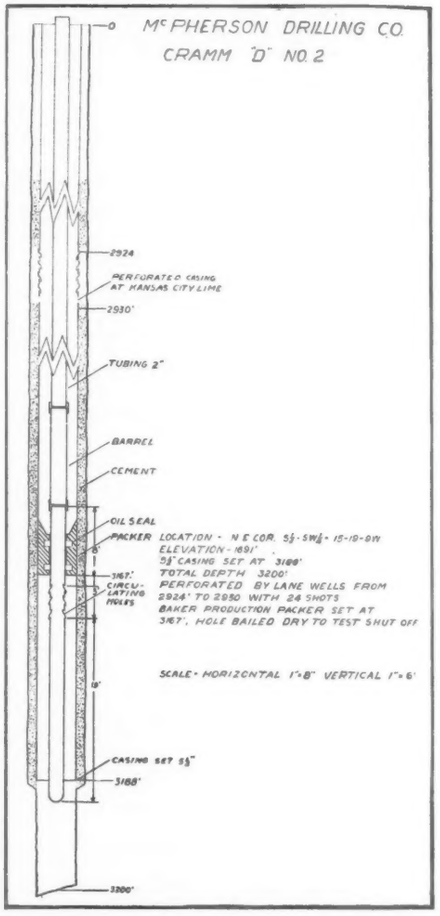
In outlining the practical features of the plan, Mr. Ritchie explained that there were many marginal pools in western Kansas in which more than one zone of minor importance occurs, citing for example low-porosity areas in which both the Lansing-Kansas City lime and the underlying Arbuckle dolomite produce. By producing from either zone one-half of the month, sufficient recoveries can be obtained to insure profitable operation, even at present allowables. The method would do away with the necessity for drilling twin wells in fields where offsets are completed from another pay zone.

Mr. Ritchie told how his firm had carried on experimentation with this method since July 1940 in the Cramm pool of western Rice County.

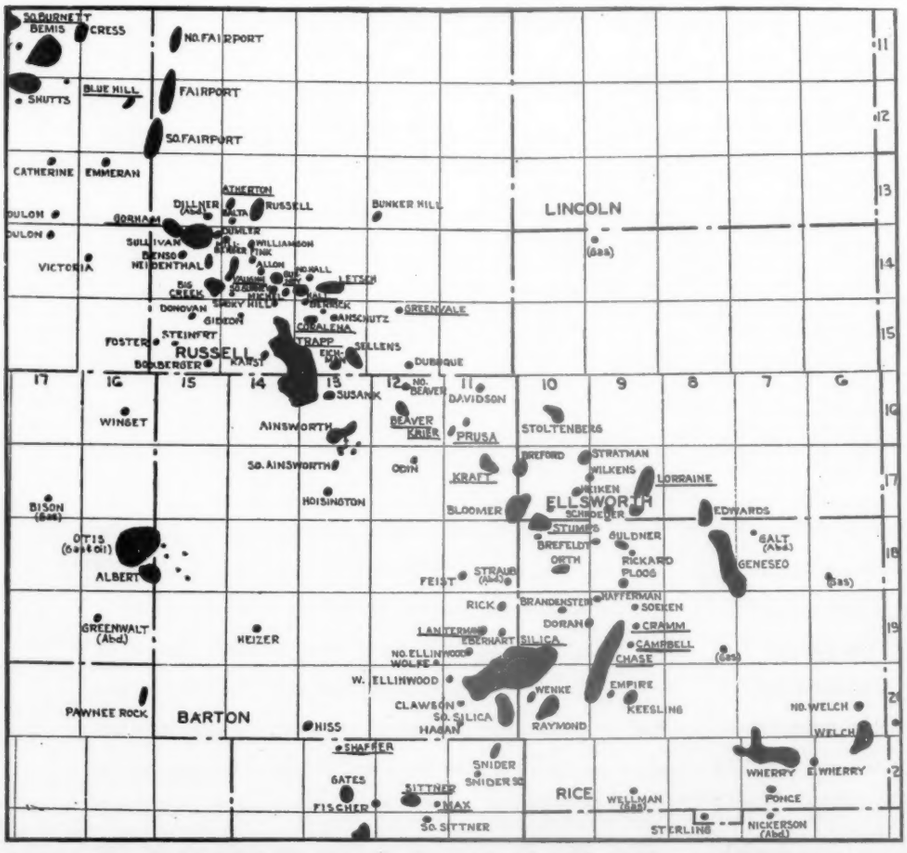
He said that an effective sealoff was obtained from the Lansing-Kansas City lime series productive at a depth of 2,924 ft., and the Arbuckle dolomite found at approximately 3,200 ft. The effectiveness was checked by the differential in gravities, the Lansing producing at 42-42.5 (corrected) gravity crude, while the Arbuckle yielded a 48.5 to 49 (corrected) gravity oil.

Merely raising the perforated section of tubing blanks off the lower zone, he explained.

Kansas conservation officials foresaw that the plan would require policing and use of a tubing seal to be broken on inspection twice monthly. An additional expense in field men would be required but would not be large enough to impose a burden on a pro rata basis.




***Cross-section showing detail of packer installation to permit producing separately from either of two oil zones through movement of perforated tubing section***




***Production map showing western Kansas areas where two-zone completion would add important oil reserves. Underlined are areas producing from several pay zones***

Western Kansas areas producing from the Lansing-Kansas City lime series and lower formations include the following fields:

| Pool— | County |
|---|---|
| Atherton | Russell |
| Big Creek | Russell |
| Big Creek South | Russell |
| Blue Hill | Ellis |
| Bradford | Barton |
| Burnett | Ellis |
| Campbell | Rice |
| Chase | Rice |
| Coralena | Russell |
| Cunningham | Kingman-Pratt |
| Dopita | Rooks |
| Gorham | Russell |
| Greenvale | Russell |
| Hall | Russell |
| Heinz | Rice |
| Krier | Barton |
| Lanterman | Barton |
| Lerado | Reno |
| Lorraine | Ellsworth |
| Max | Stafford |
| Prusa | Barton |
| Russell | Russell |
| Silica | Barton-Rice |
| Sittner | Stafford |
| Trapp | Barton |
| Vaughn | Russell |
| Weathered | Cowley |

Total: 27 pools, 10 counties.

*(Continued on Page 121)*

# *Oil Industry Escapes Specific Citation in T.N.E.C. Report*

WASHINGTON, D. C., Mar. 31.—No specific recommendations regarding the oil industry are contained in the final report of the Temporary National Economic Committee submitted to the Senate today by its chairman, Sen. Joseph C. O'Mahoney of Wyoming.

The oil industry, in fact, is scarcely even mentioned in the report and except for a few recommendations on insurance there are no proposals dealing with a particular industry as such.

Many recommendations are made, however, which would affect all lines of business, including the oil industry, and while some of them are quite drastic most of them have been advanced before, either by the T.N.E.C. or by other federal agencies. Since the T.N.E.C. is not a legislative committee of Congress it cannot initiate legislation, though its findings may have considerable weight with Congress in considering any bills which may be presented as a result.

In general the report is pretty tame and dull, considering the fanfare and excitement with which the T.N.E.C. was created and began its investigation of concentration of economic power. From the standpoint of the interest of business in maintaining the status quo at this time, however, no news is good news, and the "story" lies in what the committee might have said but didn't.

Faith in free enterprise and private capitalism is expressed throughout the report, and the recommendations for legislation are described as instruments to preserve the competitive system. There is no attack on bigness in business itself, no attempt to break up big corporations or to turn the clock back, nor are any of the proposals of a punitive nature. No legislative panacea is suggested, and there is no hint in the report of national economic planning, nor of federal regulation of natural resource industries in the name of conservation or anything else.

Some of the recommendations were not approved by all members of the T.N.E.C., and a few separate statements are included. This is particularly true of Senator O'Mahoney's long-cherished plan for "national standards for national corporations," from which four members dissented, though it is not clear whether the proposal is for federal incorporation of companies or licensing them to do an interstate business.

Briefly stated, the legislative recommendations of most importance to business are:

Repeal of resale-price-maintenance laws.

Elimination of basing-point systems of pricing.

Stringent enforcement of the antitrust laws and larger appropriations for this purpose.

Heavy civil and criminal penalties for violation of the antitrust laws, including the proposal in the O'Mahoney-Hobbs bill of last year to punish officials of convicted corporations by preventing them from engaging in a similar business for a period of time.

Registration of corporation mergers and prohibitions on mergers of corporations whose combined assets would exceed a stipulated figure.

Registration of trade associations and specific prohibitions against trade-association activities considered to be in violation of the antitrust laws.

A series of changes in the patent laws, chiefly to prevent restrictive licenses and use of patents to obtain other forms of control over an industry.

There are also a number of other recommendations of less general interest or not involving specific legislation.

No new system of business regulation or antitrust enforcement, such as revival of N.R.A. codes, is suggested in the report, and there is a statement that the use of declaratory or advance rulings on the legal status of proposed business practices would not improve antitrust enforcement.

As for the future, the committee appears to be split. Chairman O'Mahoney suggests that Congress call a national conference of all organizations interested in economic activity to discuss ways and means of dealing with economic problems, while Isador Lubin and Leon Henderson suggest the creation of an official body to study economic problems arising out of the postwar readjustment period.

## Pennsylvania Oil Men Meet To Discuss Secondary Recovery

WASHINGTON, D. C., Mar. 31.—The possibilities for secondary recovery in the southern end of the Pennsylvania Grade crude-oil region in the light of experiences in the northern end of the region and some results in the few secondary efforts made in southwestern Pennsylvania were set forth at a meeting of producers here by Dr. Parke A. Dickey, state oil and gas geologist of the Pennsylvania Topographic and Geologic Survey.

The meeting, which was sponsored by the Pennsylvania Grade Crude Oil Association was attended by 120 oil men from southwestern Pennsylvania, southeastern Ohio and West Virginia.

In the discussion which followed a number of men experienced in secondary recovery took part. They included Dr. S. T. Yuster and Dr. H. M. Krutter, in charge of research studies in water, gas and air drive at Pennsylvania State College; C. C. Hogg, of Titusville, of the National Petroleum Association; R. B. Bossler and H. Douglas Brown, Jr., Oil City, of the Brundred Oil Corp.; Dr. R. E. Sherrill, head of the department of petroleum engineering of the University of Pittsburgh; Dr. E. T. Heck, of the West Virginia Geological Survey; Dr. C. W. Fettke, of the faculty of Carnegie Institute of Technology; A. E. Booth, Bradford producer, and C. M. Jolly, of the Washington Oil Co.

D. T. Ring, president, Preston Oil Co., Columbus, Ohio, a director of the association, presided. The meeting was in charge of W. W. Dunlap, of the association staff. Parker L. Melvin, Bradford, president of the association, and J. E. Moorhead, Oil City, executive secretary, spoke briefly.

Next week's issue of The Oil and Gas Journal, Engineering and Operating Section, will carry an article by Dr. Dickey, containing his remarks presented at the meeting, on the value of intermittent repressuring.

*Seated: H. Douglas Brown, Jr., and Robert B. Bossler, Brundred Oil Corp., Oil City, Pa.; Dr. H. M. Krutter, of Penn State College. Standing: Dr. S. T. Yuster, Penn State College; Dr. Parke A. Dickey, state oil and gas geologist of the Pennsylvania Topographic and Geologic Survey*

## Fast Schedule Arranged For Journal's Special Train to A.P.I. Meeting

Engagement of the most modern, streamlined-diesel equipment for The Oil and Gas Journal's special train to the annual meeting of the American Petroleum Institute in San Francisco, Calif., next November will make possible an elapsed-time schedule of 43 hours from Tulsa and 47 house from Chicago, Ill. Journal specials have been operated a number of times to annual A.P.I. meetings and they have become practically an institution in the oil industry. Sponsorship by an organization that is part of the industry is especially important this year since it will assure oil men of companions who are concerned with identical problems on the longer-than-usual trip to the meeting.

Arrangements have been made to consolidate passengers The Oil and Gas Journal's A.P.I. special from the East and Middle West at Chicago, and from the Mid-Continent and Gulf Coast at Tulsa. Traffic from the two focal points will be consolidated at Newton, Kans., into one superspeed unit, leaving that city at 10 p.m. October 31.

The Journal's special will leave Tulsa at 4 p.m. October 31 and the Chicago section departs from that city at 11:45 a.m. the same day.

From Newton, Kans., the special train will swing southwest through La Junta, Colo., Albuquerque, N. M., Bakersfield, Calif., and arrive at San Francisco at 9 a.m. November 2.

The Santa Fe Railway will use Super-Chief equipment for The Oil and Gas Journal's train.

## Discuss Amendment to California Gas-Waste Act

The director of natural resources, Richard Sachse; Reed Bush, oil and gas supervisor, and a number of production engineers attended a meeting in Los Angeles, Calif., this week to discuss a proposed amendment to the gas-waste act. The act, as as it now stands prohibits an unreasonable waste of gas. It has been proposed to amend the act to clarify and limit "unreasonable." It was brought out that it is necessary to have some tolerance in the handling of operations because of unforeseen engineering problems and especially in the operation of wells in areas remote from marketing facilities.

Operation of the gas act does not specifically regulate production of crude oil but reduction of gas withdrawals from flowing wells will automatically curb immediate production of crude. One of the outstanding needs is the establishment of a policy that can and will be enforced throughout the state. Recently a move was started whereby the Department of Natural Resources and the state Railroad Commission would jointly investigate the natural-gas market, production and distribution facilities. It is regarded as a conservation move and may have a substantial effect on the production of dry gas fields in the San Joaquin Valley and central part of the state.

# Study of Cost Factors Essential In Determining Contract Price

By ARCH ROWAN
President, Rowan Drilling Co.

**Basic factors that determine the contract price for drilling wells are reviewed in this paper which was presented before the Gulf Coast chapter of the A.P.I., March 24.**

**Unnecessary delays in the drilling operation caused by inefficient cooperation from operators is one of the uneconomical practices that, the author contends, can be avoided.**

**Free coring and requiring contractors to furnish mud are fundamentals of drilling costs that find their way into rates per foot which should be charged to the operator since, actually, he pays for it in the long run. Savings may accrue to the operator if less than the maximum number of cores are required and mud consumption falls below the volume estimated in arriving at the contract price.**

THE relationship of the drilling contractor to the operator is substantially that of the employe to the employer. Practically all drilling contracts are made on the basis of what is known as a footage contract, i.e., the contractor makes the hole and performs the labor necessary to set the pipe and complete the well and the operator furnishes the materials and special services, such as cementing, electrical logging, etc.

The two principal considerations in the mind of the operator, I presume, in this type of contract, are the price per foot to be charged by the contractor and the workmanship which the contractor is able to give. This last, of course, is based upon his past performance. In other words, his reputation as a contractor, and this reputation or this ability to turn out a finished product in a first-class workmanlike manner are entirely dependent upon the experience, ability, and knowledge of the contractor, his tool pushers, drillers, and other employes. Certainly price should not be the all-governing consideration in the selection of a drilling contractor to perform an intricate engineering feat, such as drilling and completing a deep hole for the production of oil. An oil well is a structure built to last for many years, and the workmanship which is put in it has a bearing on the life and efficiency of the operation.

In considering the price which is to be paid a contractor for his work, it should be remembered that the contractor has no control over the price which he pays for supplies, such as wire lines, drill pipe, drilling bits, and other necessary repairs to his equipment. His only control over cost is in the wages which he pays his employes, and the efficiency of these employes in the conduct of their work so as not to abuse or tear up his equipment, but instead to operate same in the most economical way possible. The care and selection of these employes is of the utmost importance, not only to the operator, but also to the contractor. These employes, including the tool pusher, are really the employes of the operator, since they are taking orders from the operator, while possibly not directly but through the contractor, and the efficient execution of their work is of prime importance.

*In Gulf Coast drilling operations are often carried on in swamps where the boggy nature of the soil requires wide use of matting to support all heavy equipment*

## Contractor's Chief Concern

The cost of drilling a well plus a fair and reasonable profit is all that concerns the contractor. He must demand this and get it or he will not long last in business. The same applies to the conduct of the business of the operator. He cannot long continue to lose and stay in business. The cost of drilling a well depends largely upon the cooperation which the contractor receives from the operator. Time is money, and many unnecessary delays in the drilling of a well caused by the operator added up at the completion of the well make a sizable sum in the contractor's computation of his total cost of the well. There is a tendency on the part of some of the operating companies to feel that a contract having been let to a contractor and his duties and obligations having been set out in this contract, the problem is solely the contractor's from then on out. Any delays or extra cost which might be added to the drilling of the well, some feel, are not out of the pocket of the operator, since the contract price has been established and the agreement signed. This is wholly erroneous as nearly all first-class contractors today keep good-cost statements and the price which they bid or ask for the drilling of a well is based upon the average cost of operations in that district, plus a reasonable margin of profit. If the cost of these operations go up due to lack of cooperation on the part of the operator, then the contract price must necessarily go up, and in the end, these delays are being paid by the operator. Most of the delays are not deliberate on the part of the operator, but are due to lack of forethought in planning and cooperating with the contractor. Such planning and cooperation, in my opinion, is essen-

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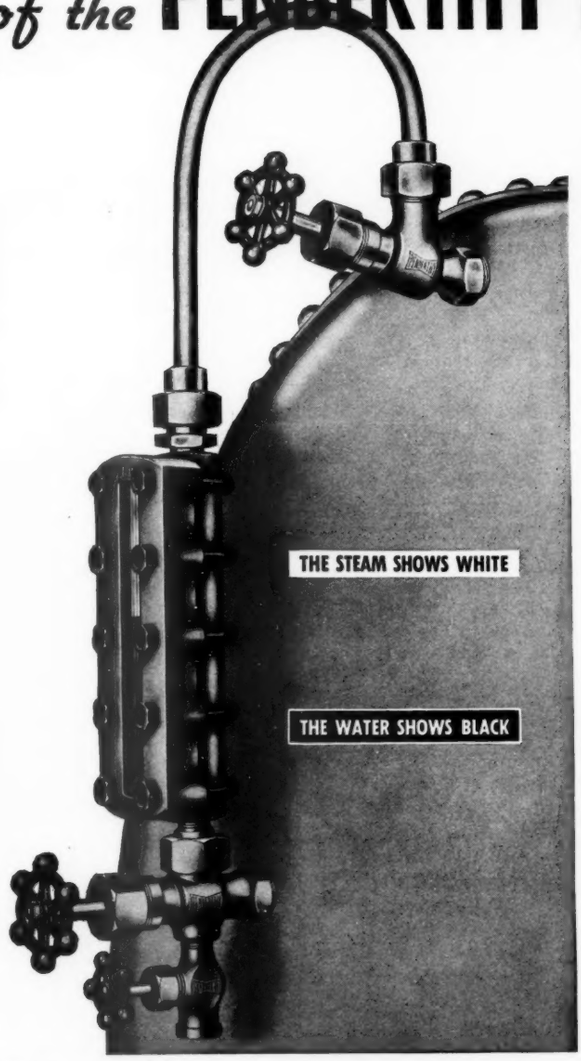

● "It is the most simple gage to service that I have ever seen." This statement is typical of the remarks made throughout the oil fields since the Penberthy Reflex Gage was introduced.

Note particularly the U-Bolt type of construction that is the strongest and the simplest to service. To replace a glass, simply remove the nuts on the face of the gage . . . it is unnecessary to work between the gage and the boiler.

The Penberthy Reflex Gage shown here is available in both Navy Bronze and Malleable Iron; it is recommended for working pressures to 350 lbs. at 450° F. Gage is furnished complete with Penberthy "Dripless" Drain Cock shown.

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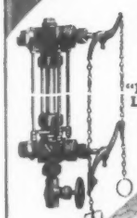
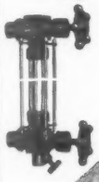

"Navy Type" Liquid Level Gage

"Safeguard" Automatic Liquid Level Gage

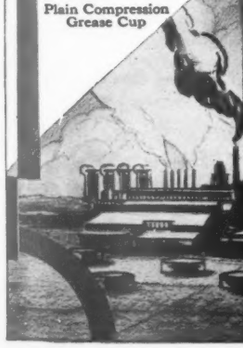

"All-Iron" Automatic Liquid Level Gage

Gas Engine Lubricator

Snap Lever Oiler

Plain Brass Oil Cup

Plain Compression Grease Cup



Screw Plunger Grease Cup

Spring Compression Grease Cup

Automatic Electric Sump Pump

Automatic Cellar Drainer (Water or Steam Operated)

Dipless Air Cock

tial to the efficiency of the drilling contractor and his organization.

There are a great many operators who feel that the hazard of drilling an oil well having been assumed by the contractor, it is of no consequence to the operator, and they sometimes require the contractor to perform very hazardous operations with the thought in mind that if anything should happen, it would be nothing out of the pocket of the operator. Such, of course, is not the case. Again, if the contractor gets into trouble on any particular well and should happen to take a loss of several thousand dollars, this cost will be reflected in the average which he computes in that district in setting his contract price for the future. Therefore, in my opinion, it should be the duty of the operator to weigh carefully the results which he is trying to obtain from some operations which the contractor has warned him might be extremely hazardous. If the operation is of the utmost importance, of course, it should be performed by the contractor with the greatest care, regardless of the hazard. It should always be borne in mind that the contractor and his employes are human, the same as the employes of the operator, and cannot do the impossible. He can only do that which is good sound practice, and good sound practice is dictated by past experience. To ask him to experiment or attempt to do the impossible is unfair and will be reflected in the costs which he has to justify in setting his price for the work he is asked to perform.

### Importance of Steady Operation

The cost of operating a drilling-contracting company is largely determined by the contractor's continuity of operations. This can best be explained by taking the history of the United States Steel Corp. and comparing their earnings with their percentage of operations. It is a well-known fact that the steel corporation has to operate at more than 35 per cent of its capacity before it can make a profit. Anything below this creates a loss; anything above this creates or makes a profit. In the operation of drilling rigs, if a contractor can operate his drilling rigs in a given field on a continuous basis, i.e., if locations are waiting, his costs will be materially less than if each well is finished and then a period of time elapses between the commencement of another well. Likewise, if a contractor can operate two or more rigs in a given field, his operating costs are lessened. In both of these instances, the contractor has, or should, pass these savings on to the operator by reducing the contract price per foot. Since the operator, as stated above, is presumably interested in cost and also workmanship, this last phase is one which should be given particular attention by the operator. The operator should so plan his work, if possible, that this continuity of operations may be maintained and if possible, where more than one drilling rig is operated in a district, the contracts should be given to one contractor until he has an efficient number of rigs in that district. This does not mean that one contractor should be permitted to do all the work in one field, but the efficient operations of the contractor should be considered, and if possible, he should be permitted to operate enough drilling rigs in one district so as to gain this maximum efficiency.

The function of the contractor is to perform the work required by the operator in a first-class workmanlike manner, and at a cost comparable with that of the operator if he ran his own tools, taking into consideration, of course, all elements of such cost. These should include proper charges for depreciation, obsolescence, overhead and supervision, and also camp facilities for employes, annuities, insurance, etc., and any other benefits given employes. With proper cooperation between contractor and operator, this can be done. The resulting advantage to the operator is the elimination of invested capital and a decrease in number of employes and possible labor troubles. The contractor, being a small organization, can very likely run his organization with less labor trouble than the operator because of the personal contact with his men. Practically every man working for our organization addresses me by my first name, and there is a bond of comradeship between most contractors and their men brought about by enduring the same hardships which is of inestimable value in the relations of employer and employe.

The operator, of course, in computing the cost of his own company tools, should charge into the cost of the drilling such items as the contractor would charge toward the drilling of a contract well. It is my understanding that some companies have special accounts where they charge such items as lost holes, bad blowouts, and fishing jobs, and then at the end of the year they apportion these to all of the drilling costs on a pro rata basis. It is probably for this or other accounting reasons that many times the first cost chargeable to a well by an operator is not the accurate or final cost which will be charged against that well when drilled by company tools.

One other phase of the relations between the contractor and the operator is the tendency on the part of some operators to erroneously put out information to other operators regarding the cost of operating their company tools. I do not mean by this that there is a deliberate misrepresentation. I think it is human for all of us to try to impress our fellow man with the fact that we run our business with a maximum of efficiency, and possibly for this reason, or other reasons, in discussing the costs between operators, one may pick an extremely low-cost well and base his statement for field operations on this particular well, whereas it does not reflect the average cost of wells in that district. If this is done, and the other operator who happens to receive this information in doing all of his work by contract, he naturally seeks to find out why his wells are costing more money than his competitor who is using company tools. The cost of pipe and other supplies and services being fixed, he has only one way to reduce his cost and that is to reduce the price which he is paying his drilling contractor.

### Complete Specifications Needed

In asking for bids, it would be advantageous from the operator's standpoint to put out a complete specification of the work to be done and the services to be performed and the services and materials to be furnished by the contractor so that each contractor could bid on an exact, identical set of specifications. This, of course, would be the procedure if a contractor were to bid on a building. It also seems to me that the practice of asking the contractor to furnish a maximum amount of mud or specified number of free cores is a costly procedure from the standpoint of the operator. If the contractor is experienced and knows his costs, he will add this into the footage price which he bids and the operator, in reality, will be paying for these services even though they may be hidden in the footage price. Consequently, if fewer cores are taken than those set out as free, or a less amount of mud is used than that called for in the bid, the contractor will profit at the expense of the operator.

There are many good drilling contractors in the oil industry, and in my opinion they are working hard to improve the technique of drilling and are trying to give the service which the operator demands and is justly entitled. It is only possible to get this by maintaining a high-class experienced personnel, and it is only possible to maintain this high-class efficient personnel by paying fair and adequate wages to the men. Therefore, in the selection of a contractor, price should not be the sole and governing motive. The contractor's equipment, his personnel, and his own experience should be considered, if the operator expects first-class workmanship.

# *The Annual Statements Say . . .*

### Continental Oil Co.

THE company added $28,253,812.14 to fixed assets in 1940 with wells and equipment accounting for 52.23 per cent of the total and manufacturing claiming 24.9 per cent.

Refinery work by the company scheduled for completion during the second quarter of this year includes a combination catalytic reforming and catalytic polymerization unit at Ponca City, Okla., and a complete refinery with thermal polymerization and alkylation units at Lake Charles, La., having a crude-processing capacity of 7,000 bbl. daily.

Equipment for the maximum economic recovery of propane and butane was installed at K.M.A., Archer County, Texas, and at Ville Platte, Evangeline Parish, Louisiana, which supply the light fractions for the company's polymerization and alkylation plants.

Four major-refinery-construction jobs were completed last year. A Cross cracking unit was installed at Ponca City, a catalytic polymerization and liquefied-gas unit at Glenrock, Wyo., a thermal polymerization unit at Wichita Falls, Tex., and a solvent-treating and dewaxing plant at Ponca City.

### Ohio Oil Co.

SEVERAL tests in addition to three started recently are planned for blocks acquired in Ohio and Pennsylvania where the company last year launched an aggressive program of geologic and geophysical exploration. The company joined in unit agreements for the Cotton Valley field, Webster Parish, Louisiana, and the La Gloria field, Jim Wells and Brooks counties, Texas, where pressure-maintenance projects are under way or scheduled to start soon.

A polymerization unit at the Robinson, Ill., refinery will be placed in operation this year.

### Venezuelan Petroleum Co.

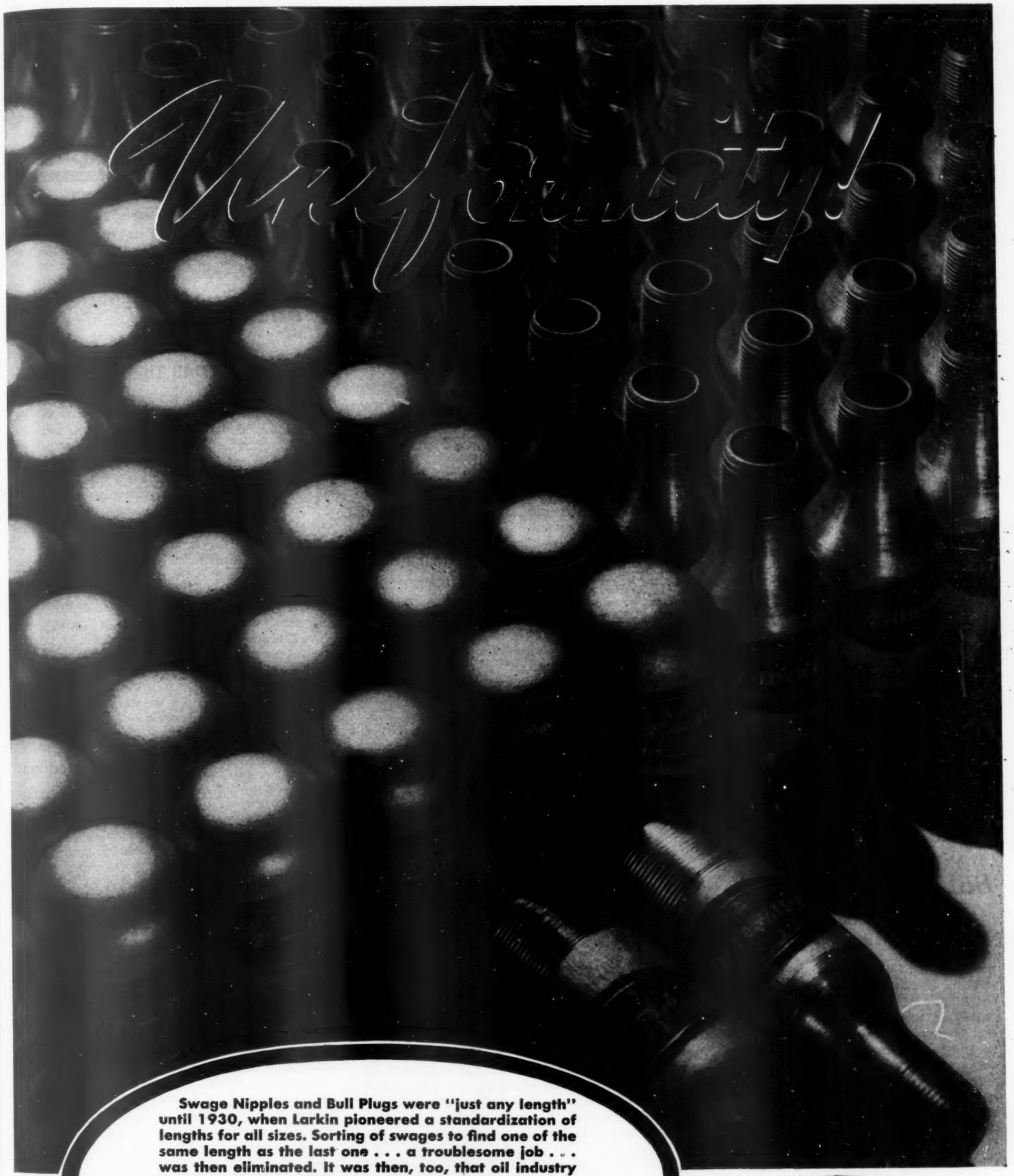
LOCATION of a pipe line and improvement of deep-water terminal property was started early this year in Venezuela as a preliminary to development of potentially productive property near the town of Santa Barbara in the State of Monagas, Venezuela. The property to be developed has one well which indicated commercial production in February.

### Argo Oil Corp.

THE company participated last year in the installation of a pressure-maintenance plant for the Leo horizon in the Lance Creek field, Wyoming, which already has given indication that the ultimate recovery from the affected zone will be increased substantially.

### National Refining Co.

THE policy instituted a year ago of showing income and outgo items for the individual branches of the company's operations was continued in the 1940 report. Operating economies that will accrue from the new pipe line built late last year from Hooser to the Coffeyville, Kans., refinery will be reflected this year. Directors have authorized installation of new equipment at the Findlay, Ohio, plant but the report did not elaborate. Operating losses of $382,139 for marketing and $14,000 for manufacturing were shown.

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**See pages 1435-43, your 1941 Composite Catalog.**

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# International

## U. S. S. R. . .

### Oil Shipments to Reich Unrelated to Imports

WHILE British Ministry of Economy officials have asked the United States to discontinue exports of oil products to the U.S.S.R. in the belief that such supplies are making others available to Germany, this belief is denied by the opinions of qualified observers active in international oil affairs. The latter contend that Russian shipments to the Reich consist almost entirely of lubricating oil since in most other petroleum products the Soviet Union is reportedly insufficient.

If Russia is supplying Germany with lubricants, the United States exports to the U.S.S.R. are not a factor for exports of lubricating oils to Russia last year totaled less than 50 bbl. Virtually all United States oil exports to Russia in 1940 consisted of motor fuel of lower than aviation grade. Shipments of other than aviation-grade gasoline to Russia in 1940 totaled 1,065,421 bbl., all but 75,000 bbl. of which were shipped in the last 5 months. In January 1941 our gasoline exports to Russia were 28,000 bbl., less than one-seventh of the average of the preceding 5 months.

Relations between Germany and Russia, strained by the Nazi invasion of the Balkans, are among the European enigmas. It has been reported that Russia has decided to terminate shipments of oil and gasoline to Bulgaria following Germany's seizure of all Bulgarian Black Sea ports and may go so far as to interrupt shipments to Germany itself. If Yugoslavia joins the tripartite pact. Russia would reconsider her entire policy toward cooperation with the Reich, according to these reports.

## Bolivia . .

### Bolivia Reveals Basis For Oil Conversations

WILLINGNESS to negotiate a settlement of the Bolivian Government's seizure of Standard Oil Co. of Bolivia's property on a basis of "adjusting accounts which will not assume the character of indemnization" has been voiced at La Paz by Edmundo Vasquez, minister of economy.

The inference was left that an operating arrangement may be evolved from current discussions that would retain title to oil properties for the government but would, in effect, permit Standard to resume complete management and active exploration.

Mr. Vasquez said that petroleum deposits are state property and therefore their exploitation is a state function, and that the Standard case will be continued as a subject of extraofficial conversations with the U. S. State Department as an intermediary.

He said the conversations would be conducted on the following basis:

First, Bolivia's absolute refusal to consider returning to Standard Oil property and concessions which the Bolivian Government canceled when the properties were confiscated 4 years ago as they are considered government property.

Second, a refusal to consider any revision of a court decision regarding the legality of the Standard company's rights.

Third, the refusal of national or international arbitration.

The properties which were confiscated consisted of wells, equipment and roads which the company had constructed.

It was said that the question of the Standard claim had been reopened in the Bolivian Senate in the hope that a settlement will pave the way to the extension of loans or credits from U. S. Government lending agencies.

## Arabia . .

### C. A. S. Co. Production Reaches 20,000 Bbl.

DAILY average production of the California Arabian Standard Oil Co. from its Arabian concession on the western shore of the Persian Gulf was 20,000 bbl. per day at the close of 1940. Despite the influence of the war which has generally curtailed production outside the United States, California Arabian Standard Oil Co.'s production was up almost 50 per cent from its average of 14,000 bbl. per day at the close of 1939.

During the past year this company erected a 3,000-bbl. refinery at Ras Tanura on the gulf to comply with terms of the concession and to supply the company's requirements of petroleum products as well as those of the Saudi Arabian Government. This refinery is served by a 43-mile pipe line from the Damman field. The pipe line and a terminal for loading ocean-going tankers were constructed in 1939. The new refinery went on stream last November.

The consolidated net profit of the California Arabian Standard Oil Co. for 1940 is estimated at approximately $300,000 against $680,000 in 1939.

## Rumania . .

### Earthquake Damage Not So Severe as Thought

A SUMMARY of recently published seismological bulletins indicates that the earthquake of last November 10 in Rumania was not so severe that the resultant damage was irreparable. According to these bulletins, published in Europe, the earthquake center was at considerable depth, approximately 100 miles below the surface northwest of the town of Buzau.

Damage was reported to be heavy in and around Ploesti, center of the producing and refining district. Damage to brick smokestacks and buildings was especially severe. Some oil tanks were cracked, in places to a width of 1 in. Near Moreni, 20 miles west of Ploesti, a large number of homes were destroyed and cracks several inches wide appeared in the earth's surface.

It was also reported that "a major pipe line in the vicinity of Moreni to Ploesti was interrupted due to soil displacement. A number of fires were started and the reports state that they were brought under control. No evaluation of the extent of damage to producing wells was made.

## Venezuela . .

### Orinoco Moves In to Drill Third Netick Well

ORINOCO Oil Co., a subsidiary of Pure Oil Co., has moved in to drill a No. 3 well in the Netick area in the district of Mora. The location is about 2,500 m. northeast of the No. 2 in the Netick field, where the first well was completed as a 500-bbl. per day well about 8 years ago. The first well was lost, but a second was also completed as a producer. The property has been inactive since the completion of the No. 2 well.

Mene Grande Oil Co. has resumed drilling in its wildcat at Quiamare, which was started February 4 but shut down for some time due to lack of water. Casing has been cemented at 2,000 ft. and drilling was resumed at that depth. This company's fourth well at Leona-El Tigre is reported testing. Its RG-3 at Santa Rosa, 1,200 m east of the RG-2 which was completed January 21 is drilling at 3,500 ft. RG-3 was spudded in February 2.

## Philippines . .

### Concession Granted on Large Area of Islands

EXCLUSIVE privilege to prospect for and develop oil reserves in nine complete provinces and parts of two others in the Philippines has been granted to the National Development Co. of Manila, a quasigovernment agency. At the present time there is only one other company, the Far East Oil Development Co., operating in the islands.

The Far East Oil Development Co. has two areas under lease and on one of these, in northern Cebu, the company has drilled a well to 6,000 ft. According to these reports no oil had been encountered at that depth. It is understood that heavier equipment will be moved in and the test deepened to 10,000 ft.

Granting of the concession to the National Development Co. follows the virtual completion of a geological survey of the islands. This company is now reported to have engaged a geophysical crew. Funds have been allotted for the purchase of equipment and for drilling when locations have been made.

The area granted to the National Development Co. includes all of the provinces of Cagayan and Isabella in northeastern Luzon, all the provinces of Neueva Ecija, Pangasinan, Tarlac, Pampagna and Bulacan in Central Luzon north of Manila, that portion of the Province of Tayabas south and east of a line between the towns of Altimonan and Unisan, the Province of Iloilo on the Island of Panay, the Island of Cebu, and the northwestern portion of the Island of Leyte, west of a line between the towns of Ormoc and Lete.

# Natural Gas News

### Kentucky Company Building New Compressor Station

ASHLAND, Ky.—Construction of a new compressor station at Dwale in Floyd County, Kentucky, calling for the expenditure of about $500,000 and improvement of two other stations was announced here last week by P. C. Van Gilst of the Kentucky-West Virginia Gas Co.

Mr. Van Gilst, vice president in charge of operations, said increasing of the capacity of the Drift and Right Beaver compressor stations and other plant improvements are planned involving an additional expenditure of about $100,000.

"Additional wells will be drilled and there will be considerable expenditures for field lines in connection with these wells," the company executive said. He explained that these wells to be drilled in the Dwale area are in addition to the program calling for drilling 90 gas wells in the eastern Kentucky area. A recent announcement by Mr. Van Gilst brought out the fact that the Kentucky-West Virginia Gas Co. was planning the expenditure of well over $1,500,000 in drilling and construction operations before the end of 1941.

The company announced recently that it was making a survey for a 200-mile pipe line from Floyd County to northern West Virginia where the firm has large operations. The company now has approximately 700 wells in the Big Sandy region.

### Texas Gas Production Is 4.7 Billion Cubic Feet Daily

AUSTIN, Tex.—Texas produced 4,711,966,000 cu. ft of gas daily in January, an increase of 115,966,000 cu. compared to the preceding month.

"The January production," reported the Railroad Commission, "in exceeding the December volume, reached a high with the exception of the volume produced during March 1940, which is an all-time peak for gas produced in Texas during any 1 month."

The report showed 35.84 per cent of the January output went to pipe lines, the 1,688,650,000 cu. ft. daily being 148,658,000 cu. ft. more than for January 1940.

### California Gas Consumption Runs 12 Per Cent Over 1940

LOS ANGELES, Calif.—Natural-gas consumption in January this year totaled 22,679,599,000 cu. ft., a new high total exceeding requirements for the same month a year ago by 11.6 per cent.

### Lacy Seeks Commercial Gas Franchise in Dallas

DALLAS, Tex.—Application for a franchise to supply natural gas to Dallas commercial accounts at a rate of 20 cents per 1,000 cu. ft. is to be made by Roger Lacy of Longview, Tex.

### Gas Exchange Arranged By Eastern Companies

PITTSBURGH, Pa., Apr. 1.—An arrangement to exchange up to 100,000,000 cu. ft. of natural gas daily has been concluded by subsidiaries of the Philadelphia Co. and subsidiaries of the Columbia Gas & Electric Corp. An extensive cross haul will be avoided. About $3,000,000 will be spent on development work and for new equipment and the purchase of 50,000 tons of steel from an industry overloaded with defense orders will be avoided.

The companies have experienced an unusually heavy demand this winter due largely to increased requirements for defense purposes. Plans were made to augment the supplies, including a proposal of gas subsidiaries of the Philadelphia Co. to lay a 190-mile 20-in. line from Kentucky to northern West Virginia.

The Philadelphia Co. has greater gas reserves in Kentucky than it has in West Virginia, which it ships to northern West Virginia and western Pennsylvania. United Fuel Gas Co., Columbia subsidiary, has larger reserves in West Virginia than in Kentucky, which it ships to southern and western Ohio. Under the new arrangement, the Philadelphia Co. will supply gas in Kentucky to United Fuel and the latter in turn will supply an equal volume to the Philadelphia Co. in northern West Virginia.

### Liquefied-Gas Reserve Maintained on Coast

The city of Long Beach, Calif., has 22 storage tanks for liquefied gas, each with a capacity of 22,722 gal. Total capacity is 499,884 gal. On the basis of 32 cu. ft. of gas per gallon of liquefied gas, the city has a standby supply of 15,996,288 cu. ft. of gas.

The expanded liquefied gas has a B.t.u. value of 3,000 whereas natural gas now supplied to consumers averages about 1,050 B.t.u.'s. The setup is so arranged that 500,000 cu. ft. of expanded liquefied gas can be supplied each hour if necessary.

# Recycling News

### Natural-Gas Processing In Texas on Increase

AUSTIN, Tex.—Natural-gas processed by recycling and repressuring plants continued to increase in Texas last January. Combined use of gas by these types of operations in January was 1,276,335,000 cu. ft. daily compared to 1,234,554,000 cu. ft. in December 1940, an increase of 42,000,000 cu. ft.

### Pressure Decline Checked By Recycling at Schuler

EL DORADO, Ark.—The rate of decline in bottom-hole pressure in the Jones sand wells of the Schuler field, Union County, Arkansas, has been cut from 2 lb. to 4/5 lb. per day since the recycling program was inaugurated 15 days ago. The volume of vented gas has been cut from 38,000,000 to 15,000,000 cu. ft. per day, it is shown in a preliminary report by the committee of operators.

At present, 41 wells are producing from Jones sand and 99 are shut down.

The Schuler field program is the first recycling project attempted in Arkansas.

# Refinery News

### Pure Oil Co. Building Aviation-Gasoline Plant

TOLEDO, Ohio.—Work started here April 1 on a new aviation-gasoline refining unit for Pure Oil Co. The unit will cost about $500,000 and will produce about 3,000 bbl. of motor fuel daily.

### Reorganization Hearing Set for Atlas Company

A preliminary hearing in federal court, Shreveport, La., has been set to examine plans for reorganization of the Atlas Pipe Line Corp. The company, whose chief properties are a modern 12,000-bbl. refinery and an office building at Shreveport, 166 miles of 6 and 8-in. pipe line in Arkansas, North Louisiana and East Texas, is in receivership.

The reorganization plan has not yet been filed with the court, but is expected to propose the formation of a new corporation by a group of oil producers with properties in South Arkansas, principally Magnolia. Interested in the plan are officials of the Southwood Oil Co., Petroleum Finance Corp., Pitkin Goldston Oil Co. and the Frank Frankel interests.

# Natural Gasoline

### Texas Plants Produced Less Natural in January

AUSTIN, Tex.—Gas processed in Texas for the recovery of natural gasoline in January amounted to 2,629,503,000 cu. ft. daily, the Railroad Commission reported last week. Gas deliveries to gasoline plants in January were 22,000,000 cu. ft. daily more than in December 1940, and 18,000,000 cu. ft. over January last year.

There were 2,030,488 gal. of natural gasoline extracted daily in January compared to 2,067,509 gal. during December, a decline of 37,000 gal. daily. January production of carbon black totaled 1,311,145 lb., or 9,000 lb. less than last year's output for the same month.

### Natural-Gasoline Stocks In California Increase

LOS ANGELES, Calif., Apr. 1.—California's 87 active natural-gasoline plants produced 44,308,407 gal. of gasoline in February from 28,394,956,000 cu. ft. of gas processed.

Plant operators increased their inventories 109,074 gal. during the month. Deliveries to refineries totaled 44,328,622 gal. and 14,819 gal. were blended at plants for production of motor fuel. Losses totaled 39,665 gal. Details of February operations by regions and districts are shown below:

| | Gas treated (1,000 cu. ft.) | Natural gasoline produced (gallons) |
|---|---|---|
| San Joaquin Valley— | | |
| Belridge | 3,482,290 | 2,193,905 |
| Elk Hills | 19,250 | 43,953 |
| Kettleman Hill | 7,856,652 | 9,373,404 |
| Midway-Sunset | 801,752 | 1,559,850 |
| Mountain View | 157,964 | 230,789 |
| Miscellaneous | 2,261,627 | 1,559,113 |
| Coastal district— | | |
| Elwood | 304,863 | 365,052 |
| Santa Maria | 166,174 | 399,434 |
| Ventura Avenue | 3,143,066 | 4,545,994 |
| Miscellaneous | 743,735 | 637,564 |
| Los Angeles Basin— | | |
| Brea-Olinda-Coyote | 376,737 | 1,346,651 |
| Dominguez | 1,226,749 | 1,870,910 |
| Huntington Beach | 671,334 | 2,332,032 |
| Long Beach | 1,948,605 | 6,779,511 |
| Montebello | 1,531,305 | 1,702,861 |
| Richfield | 157,905 | 530,780 |
| Rosecrans | 1,258,302 | 1,368,510 |
| Santa Fe Springs | 1,110,234 | 4,258,050 |
| Torrance | 183,165 | 587,607 |
| Miscellaneous | 1,493,247 | 2,622,437 |
| Total (all fields) | 28,894,956 | 44,308,407 |

**DISTRIBUTION**

| | Gallons | Gallons |
|---|---|---|
| Stocks beginning of month | 1,814,328 | |
| Production during month | 44,492,180 | |
| Delivered to refineries | | 44,328,622 |
| Delivered to jobbers, brokers, or blenders | | |
| Blended at plants for production of motor fuel | | 44,819 |
| Losses | | 39,665 |
| Stocks end of month | | 1,923,402 |
| Total | 46,306,508 | 46,306,508 |

**DISTRIBUTION OF LIQUEFIED PETROLEUM GASES**

**FEBRUARY 1941**

(Thousands of gallons)

| | | |
|---|---|---|
| Number of producing companies | | 14 |
| Stocks beginning of month | | 2,778 |
| Production during month: | | |
| At natural-gasoline plants | 4,611 | |
| At refineries | 3,240 | |
| Total production | | 7,851 |
| Total | | 10,629 |
| Total demand | | 6,799 |
| Losses | | 82 |
| Stocks end of month | | 3,748 |
| Total | | 10,629 |

## Downward Trend of Oil Exports Continues

NEW YORK, Mar. 29.—Exports of both crude oil and refined products from the continental United States dropped sharply in February from January levels, preliminary reports reveal. Crude-oil exports dripped 344,266 bbl. and refined-oil exports 1,486,355 bbl. Combined exports in February were 5,092,961 bbl., against 6,923,582 bbl. in January, a drop of 1,830,621 bbl.

February crude-oil exports of 1,342,504 bbl., contrasted with a total of 3,327,267 bbl. for bbl. for February 1940 and 1,686,770 bbl. for January. Canada's decline of 525,000 bbl., partially offset elsewhere, accounted for the decline.

Aviation-gasoline exports in February were off about 20 per cent, accounted for chiefly by the reduction in antiknock exports to the United Kingdom, which totaled 62,683 bbl. in February against 188,191 bbl. in January. Aviation-gasoline exports to Japan were resumed, totaling 58,500 bbl., and China raised her total 60,000 bbl. to 84,500 bbl.

Exports of other motor fuel dropped 700,000 bbl. Major declines were reported in shipments to United Kingdom and Cuba, each about 100,000 bbl. and Australia and U.S.S.R., each about 80,000 bbl. Kerosene shipments dropped, due to Brazil, while residual-fuel-oil exports were unchanged.

Gas-oil and distillate exports suffered severely, dropping 800,000 bbl. Japan's requirements fell off 450,000 bbl.; United Kingdom, 195,000 bbl., and Cuba, 165,000 bbl. Lube oils, alone of the major refined products, showed an increase. Exports of lubricating oils to Japan almost doubled, jumping to 185,000 bbl., and Russia raised her total almost 45,000 bbl.

### COLE COMMITTEE HEARS JUSTIFICATION FOR TWO NEW PROPOSED PIPE LINES

**WASHINGTON, D. C., Apr. 1.—Construction of two southeastern gasoline pipe lines was justified today before the Cole petroleum subcommittee. Witnesses stressed the benefits to national defense of the Plantation Pipe Line Co.'s line from Baton Rouge, La., to Greensboro, N. C., and the Southeastern Pipe Line Co.'s line from Port St. Joe, Fla., to Chattanooga, Tenn. The Southeastern company's representative, A. S. Clay, attorney of Atlanta, Ga., asked the committee to recommend congressional legislation enabling the companies to cross railroad rights-of-way, with or without the approval of a federal agency. R. T. Haslam, Standard Oil Co. official, appeared for the Plantation company. The administration has publicly supported the two projects, but the Georgia Legislature recently refused to grant the companies the right to condemn private property.**

**In response to a question from Chairman Cole, Frank Buttram, president of the Independent Petroleum Association of America, told the committee that practically all purchasing companies in Oklahoma and Kansas adopted 100 per cent tank tables in buying crude oil, effective last February 1.**

**CRUDE AND REFINED-OIL EXPORTS BY MAJOR COUNTRIES OF DESTINATION**

(Data in barrels)

| Destination— | Crude oil | Aviation gasoline | Motor fuel | Kerosene | Gas oil distillate | Residual fuel oil | Lube oils |
|---|---|---|---|---|---|---|---|
| Spain | ..... | 14 | 150 | 5,528 | 48,315 | 29,297 | 21,169 |
| United Kingdom | 75,254 | 146,996 | 125,989 | 18,873 | 193,484 | ..... | 130,404 |
| Canada | 574,767 | 2,781 | 73,685 | 2,954 | 48,584 | 53,323 | 34,249 |
| Cuba | ..... | 1,661 | 3,864 | 243 | ..... | 235,200 | 3,578 |
| Netherlands West Indies | ..... | ..... | 35 | 2 | ..... | ..... | 1,061 |
| Argentina | ..... | ..... | 92 | ..... | ..... | ..... | 2,045 |
| Brazil | ..... | ..... | 1,484 | 334 | ..... | ..... | 12,393 |
| China* | 97,557 | 84,545 | 69,571 | ..... | 14,002 | ..... | 27,682 |
| Japan | 585,721 | 58,303 | 328,480 | ..... | 209,408 | 67,973 | 185,343 |
| Australia | ..... | ..... | 1,049 | ..... | ..... | ..... | 31,915 |
| U.S.S.R. | ..... | ..... | ..... | ..... | 9,028 | ..... | 57,038 |
| Territories | 72 | 18,393 | 183,340 | 29,252 | 101,271 | 233,959 | 63,465 |
| All countries: | | | | | | | |
| February, 1941 | 1,342,504 | 355,080 | 1,252,875 | 81,988 | 791,287 | 974,868 | 649,439 |
| January, 1941 | 1,686,770 | 439,998 | 2,041,474 | 91,814 | 1,594,785 | 1,002,296 | 534,123 |
| February, 1940 | 3,327,267 | †125,197 | 1,902,648 | 298,261 | 1,234,162 | 768,980 | 1,090,044 |

*Includes Hong Kong, Kwantung. †Does not include antiknock compounds.

## Provisional Compact Law Voted in New York

**WELLSVILLE, N. Y., Apr. 1.—The New York Assembly has passed a bill enabling the state to join the Interstate Oil Compact, providing a similar measure is adopted by Pennsylvania. Specific reservation was made in the New York act that nothing therein "is intended or shall be construed to prevent or prohibit the production of oil by water-induction methods." But otherwise it follows the pattern of compact enabling laws in other states.**

**Governor Lehman is the officially designated representative but he may delegate his powers to a representative.**

**The compact bill in Pennsylvania is still under consideration.**

## Oil-Case Plaintiffs Must Reveal Records

**SUPERIOR, Wis., Apr. 1.—Books of independent-jobber plaintiffs will be examined under a federal order permitting defendants in treble-damage suits, resulting from the Madison antitrust oil cases, to obtain defense information. Thirteen independent distributors are seeking $6,000,000 treble damages from seven antitrust defendants, claiming they were damaged to this extent by alleged conspiracy to fix gasoline prices.**

**Judge Patrick T. Stone signed an order requiring the plaintiffs to allow the defendant companies to** examine their books and records for the years 1938 to 1940.

The order was against the Northwestern Oil Co. of Superior which has filed suit for $750,000 actual damages—tripled to $2,250,000 under the Clayton Act. Defendants named by the Northwestern company were the Socony-Vacuum, Continental, Pure, Shell, Sinclair, Mid-Continent and Phillips.

All were convicted at Madison, Wis., a year ago of conspiracy to violate the Sherman antitrust law. The Northwestern Oil Co. suit is being handled as a test case for all the 13 damage actions filed.

## DEATHS

**IRA L. YETMAN,** 46, Tulsa district manager for Dearborn Chemical Co., died March 27 from a heart ailment. The widow, two daughters, and a son survive.

**FRANK J. LIPPERT,** 54, oil producer in western New York and Pennsylvania, died March 23 at Olean, N. Y., from an illness that had been acute for 3 months. The widow, two sisters and a brother, Charles M. Lippert, with whom he was associated in producing operations, are the survivors.

**DR. JAMES R. BAILEY,** 73, organic chemist who had been on the faculty of the University of Texas, Austin, for nearly 50 years, died March 25. He had gained wide recognition for his research and discoveries, the latest of which was the isolation of two new "benzoquinolines" from petroleum. These nitrogen compounds may be a potential source of pharmaceutical intermediates similar to quinine, morphine and cocaine. Survivors include the widow, a daughter, one sister, and two brothers.

**WALTER H. MURPHY,** 57, a retired refiner who had been employed in the past by Tidioute, Sloan & Zook and the Bradford Penn companies, died March 23 at Warren, Pa. The widow, a daughter, two sons and a brother survive.

**D. E. SANDERS,** 69, independent oil operator of Bixby, Okla., died March 27 in a Tulsa hospital, where he underwent an operation to relieve acute hiccoughing. Survivors are the widow, a son and three daughters.

**CHARLES H. MEAD,** former Mid-Continent oil operator and a member of the firm of Mead Brothers Drilling & Producing Co., Tulsa, died at his home in Delaware, Ohio, March 25.

**JAMES D. BERRY,** president, James B. Berry Sons Co. refiners and marketers, Oil City, Pa., and vice president, Quaker State Oil Refining Co., Oil City, Pa., died April 1. He leaves his widow and a son.

**M. C. MANDEVILLE,** 51, president, Manson Oil Co., which operates in East Texas, West Texas and the Wichita Falls, Tex., oil fields, died March 28. His widow and two daughters survive.

**GEORGE W. RATCLIFFE,** former secretary and treasurer of the Hope Natural Gas Co. before his retirement several years ago, died suddenly in Palm Beach, Fla., on March 20. Two sons survive.

**MAX WEHNERT,** 62, a Sinclair Oil Co. clerk for the past 27 years, died March 25 at his home in Tulsa. Death was caused by a heart attack, although he had been ill several months from diabetes. He leaves his widow.

**JAMES H. HURLEY,** 81, prominent oil producer who retired several years ago, died March 27 at his home in Kane, Pa., following a cerebral hemorrhage suffered 2 days prior to his death. During his 55 years in the oil business his principal association was with the Hanley Oil Co., of Bradford, Pa. His wife, three sons and a daughter are included among the survivors.

**WILLIAM W. CRAWFORD,** president, Edward Valve & Manufacturing Co., East Chicago, Ind., died February 19 at Miami Beach, Fla. He was born in 1882, and had resided in Chicago since 1906. He has been president of his company since 1923. His widow, a son and a daughter survive.

## THE MARKETS*

CRUDE OIL: Strength underlying the crude-oil market for several weeks broke through this week and advances of 5 to 11 cents per barrel were applied to Texas, Oklahoma, Kansas, Illinois and other Mid-Continent areas. The general advance started in Texas and promptly spread to other Mid-Continent producing states.

REFINERY: Advances of ⅛ cent per gallon in the Group 3 refining district and ¼ cent on the Gulf Coast extended recent improvement in the tank-car and cargo-gasoline market. Mid-Continent lubricating oils were increased 0.5 to 1 cent per gallon. Distillate fuels are growing strong on the Gulf Coast market but are barely holding in the inland market.

TANK-WAGON AND POSTED-DEALER: A general advance in gasoline tank-wagon prices was reported last week in Georgia and Florida and depressed areas in western New York and New England states were raised 2 weeks ago.

FINANCIAL: Moderate losses were suffered last week by oil securities. Average of 30 representative stocks for the week ended March 29: High, 22.76; low, 22.14; close, 22.49. Week ended March 22: High, 22.87; low, 22.21; close, 22.72.

*Detailed information in market section.

# PROGRAMS AND MEETINGS

## Petroleum Chemists to Hear Nineteen Research Reports

ST. LOUIS, Mo., Apr. 1.—The division of petroleum chemistry of the American Chemical Society, celebrating its twentieth anniversary, will sponsor a 2-day forum on "Analytical Methods Used in the Petroleum Industry" at the society's 101st national meeting here April 7 to 11.

Nineteen research reports by technologists from all parts of the country will be presented at the symposium, at which Dr. J. K. Roberts of Chicago, research director of the Standard Oil Co. of Indiana, and chairman of the division, will preside. New designs for a fractionating column, an instrument to measure the viscosity of opaque liquids, and a filtration cylinder will be described, together with modifications of accepted analytical techniques.

## Plans for Eastern A.P.I. Meeting At Pittsburgh Nearing Completion

Plans are nearly complete for the spring meeting of the eastern district, American Petroleum Institute, Division of Production, which will be held at Pittsburgh, Pa., April 17-18. All of the necessary committees have been functioning for several months in completing the program, including the entertainment features. O. W. Van Petten is chairman of the program committee.

Two full days of meetings will be held, at which papers covering a wide range of subjects related to the production of oil and gas will be presented and discussed. One session will be devoted entirely to the subject of secondary-recovery methods and projects in the eastern area. The special subcommittee on secondary-recovery methods of the Institute's topical committee on production practice is developing papers on secondary-recovery methods and projects throughout the United States, which will be published later in a special bulletin. Five of these papers are planned for presentation at the coming meeting. These are as follows:

"Air and Gas Drive in Pennsylvania" by R. B. Bossler, Brundred Oil Corp., Oil City, Pa., and Parke A. Dickey, Pennsylvania Topographic and Geologic Survey, Harrisburg, Pa.

"Secondary Recovery in Ohio" by J. E. Schaefer, East Ohio Oil Co., Cleveland, Ohio.

"Secondary Recovery in Kentucky" by N. M. Wilder, Petroleum Exploration, Inc., Lexington, Ky.

"Secondary Recovery in Illinois" by A. H. Bell, Illinois State Geological Survey Division, Urbana, Ill.

"Secondary Recovery in West Virginia" by E. T. Heck, West Virginia Geological and Economic Survey, Morgantown, W. Va.

One session will be devoted to papers and discussions on drilling and development problems in the eastern part of the United States. Of particular interest at this time will be the papers dealing with the use of rotary-drilling methods in the area. Subjects under consideration along this line are:

"Combination Rotary and Cable-Tool Drilling in Michigan." "Review of Illinois Drilling Practices." "Developments in Southwestern Michigan—1940."

Other sessions will consist of papers dealing with prospecting, developing and operating practices, equipment, underground surveying, etc. Subjects under consideration by the program committee are as follows:

"Progress in Geodynamic Prospecting for Oil and Gas Sands." "Oriskany Developments and Practices." "Problems Involved in Deepening Wells From the Oriskany to the Clinton Sands in West Virginia." "Pumping Equipment and Practices in New Illinois Pools." "Natural Gas Dehydration Units for Individual Wells." "Legal Considerations in Connection With the Natural-Gas Business." "Plastics From Petroleum Hydrocarbons." "Underground Well Surveying, Directed Drilling, Side-Wall Sampling and Polar-Core Orientation."

A special open house on Wednesday evening is being planned in the club room of the Engineers Society of Western Pennsylvania.

The annual dinner will be held Thursday evening, April 17, in the William Penn Hotel. Tickets will be on sale at the registration desk. Advance information indicates both excellent food and entertainment.

# CALENDAR

### April

AMERICAN CHEMICAL SOCIETY, St. Louis, Mo., April 7-11.

MIDWEST POWER CONFERENCE, fourth annual meeting, Palmer House, Chicago, April 9-10.

PERMIAN BASIN ASSOCIATION, third annual convention, Lubbock, Tex., April 14.

SOUTHWESTERN GAS MEASUREMENT SHORT COURSE, College of Engineering, Oklahoma University, Norman, Okla., April 15-17.

WESTERN PETROLEUM REFINERS ASSOCIATION, annual meeting, Arlington Hotel, Hot Springs, Ark., April 16-18.

AMERICAN PETROLEUM INSTITUTE, eastern district, Division of Production, regular spring meeting, William Penn Hotel, Pittsburgh, Pa., April 17-18.

NATURAL GASOLINE ASSOCIATION OF AMERICA, annual convention, Baker Hotel, Dallas, Tex., April 23-25.

PETROLEUM INDUSTRY ELECTRICAL ASSOCIATION, Mayo Hotel, Tulsa, April 23-25.

NATIONAL PETROLEUM ASSOCIATION, semi-annual meeting, Hotel Cleveland, Cleveland, Ohio, April 24-25.

PETROLEUM AND NATURAL GAS CONFERENCE, State College, Pa., April 25-26.

### May

AMERICAN GAS ASSOCIATION, Natural Gas Section, Dallas, Tex., May 5-8.

WEST TEXAS GEOLOGICAL SOCIETY, annual spring field trip, starting at Fort Worth and ending at Midland, May 10-11.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, Chicago, May 19-21.

AMERICAN PETROLEUM INSTITUTE, eleventh midyear meeting, Mayo Hotel, Tulsa, May 19-22.

NATIONAL ASSOCIATION OF PURCHASING AGENTS (Oil Company Buyers' Group), Stevens Hotel, Chicago, May 26-29.

NATIONAL OIL SCOUTS AND LAND MEN'S ASSOCIATION, annual convention, Dallas, Tex., May 29-31.

### June

SOCIETY OF AUTOMOTIVE ENGINEERS, summer meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., June 1-6.

ILLINOIS - INDIANA PETROLEUM ASSOCIATION, ninth annual petroleum conference, Robinson, Ill., June 7.

KENTUCKY OIL AND GAS ASSOCIATION, midyear meeting, Lexington, Ky., June 20-21.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, annual meeting of Petroleum Division, Kansas City, Mo., June 16-20.

PENNSYLVANIA GRADE CRUDE OIL ASSOCIATION, annual meeting, Bradford, Pa., June 19-20.

AMERICAN SOCIETY FOR TESTING MATERIALS, forty-fourth annual meeting, Palmer House, Chicago, June 23-27.

## Western Petroleum Refiners Announce Program for Meeting

The Western Petroleum Refiners Association has completed the tentative program for the general sessions of the twenty-ninth annual meeting, which is to be held at the Arlington Hotel, Hot Springs, Ark., on April 16, 17 and 18.

Col. Willard Chevalier, publisher of Business Week, will speak at the afternoon session Thursday, April 17, on "Business Under Arms." Colonel Chevalier was an officer in the Army Engineers in the A.E.F. He has had broad experience in many lines of business, and has received awards from a number of professional societies.

On Friday afternoon, April 18, Paul G. Hoffman, president of the Studebaker Corp., will talk. His title will be "The Automobile—Is It Lipstick or Lifeblood in Our Defense Economy?" His efforts have made him one of the best analysts of the industry's problems.

The second speaker at the Friday session will be Henry M. Busch of Western Reserve University, Cleveland, Ohio. Mr. Busch will talk on "America in a World at War." He is a student of international affairs, a world traveler, and a keen analyst of the international situation. He will give special attention to the relation of petroleum and other industrial materials to political and strategic factors.

R. W. McDowell, vice president of the Mid-Continent Petroleum Corp., will talk on "Review of the Petroleum Industry Since 1939," dealing largely with the refiners' problems.

As in previous years, mornings will be devoted to technical sessions, the afternoons to general sessions.

The entertainment features of the meeting, as in the past, will all be held in the evenings. On Wednesday, April 16, those attending will be the guests of the Ethyl Gasoline Corp. at a buffet supper. On Thursday evening the supply and transportation companies will be hosts at a buffet dinner and Arkansas party. The association's annual dinner dance on Friday evening will conclude the entertainment.

**TENTATIVE W.P.R.A. PROGRAM**

**Wednesday, April 16**

Buffet supper, Ethyl Gasoline Corp.

**Thursday, April 17**

Technical session, Thursday morning. W. M. Carney, Lion Oil Refining Co., presiding.

Introductory remarks by L. D. Mann, chairman, manufacturing committee.

Modern Trends in Lubrication by William H. Oldacre, D. A. Stuart Oil Co., Chicago.

Trends of Lubricating Oil Manufacture and Utilization by Malcolm H. Tuttle, Max B. Miller Co., New York.

General session, Thursday afternoon. C. L. Henderson, Vickers Petroleum Co., presiding.

Opening remarks by C. L. Henderson, president.

Washington office report by Fayette B. Dow, Washington counsel.

Association report by J. C. Day, secretary.

Review of the Petroleum Industry Since 1939 by R. W. McDowell, Mid-Continent Petroleum Corp., Tulsa.

Business Under Arms by Col. Willard Chevalier, publisher, Business Week, New York.

Election of board of directors and officers.

Buffet dinner and Arkansas party.

**Friday, April 18**

Technical session, Friday morning. C. W. Berger, Globe Oil & Refining Co., presiding.

Carbon as a Material of Construction for the Petroleum Industry by M. J. Dorcas, National Carbon Co., Cleveland, Ohio.

Synthetic Rubber by I. E. Lightbown, Standard Oil Development Co., New York.

Meeting of W.P.R.A. board of directors.

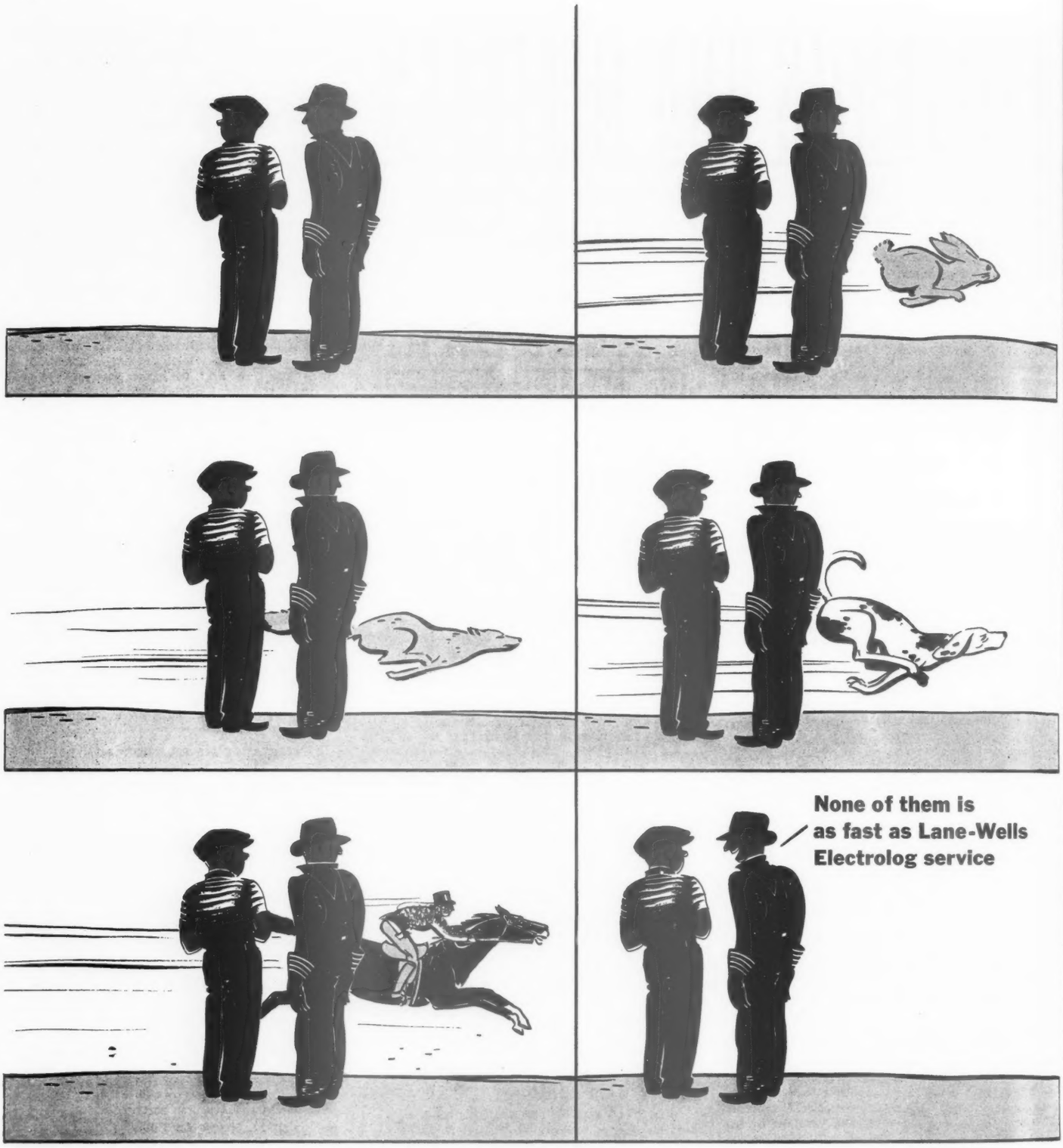
General session, Friday afternoon. Col. T. H. Barton, Lion Oil Refining Co., presiding.

The Automobile—Is It Lipstick or Lifeblood in Our Defense Economy? by Paul G. Hoffman, president, Studebaker Corp., South Bend, Ind.

America in a World at War by Henry M. Busch, professor, Western Reserve University, Cleveland, Ohio.

Report of committee on resolutions.

Annual dinner dance.

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# Wildcat Drilling in 1940

By FREDERIC H. LAHEE
Chief Geologist, Sun Oil Co., Dallas, Tex.*

THIS paper reviews data on wildcat drilling for the sixth consecutive year.[1] The states from which information was available are indicated in Fig. 1.

We have continued to use the definition of a wildcat as a hole drilled completely outside the known boundaries of pools already developed, and far enough from producing areas to be essentially a test of new possibilities. Generally speaking, such a hole would be at least 2 or 3 miles from production; but where subsurface conditions may change within short distances, as in the case of lensing sands and salt-dome structures, and where, consequently, predictions based on the known may turn out to be greatly in error, a test hole may be regarded as a wildcat even if it is only ½ or ¾ mile from production or from an abandoned dry hole.

In compiling the data, questions have arisen as to just how to classify footage drilled in certain wells which are strictly neither dry holes nor producers from top to bottom. For instance, within the boundaries of a pool a hole may be drilled below the lowest pay horizon in search of some unknown new pay. In the sense that it is exploring for deeper untested possibilities, its footage drilled below the lowest known pay is wildcat. It might be called a "semiwildcat." If it discovered oil or gas in a deeper horizon this extra footage might be listed as semiwildcat discovery footage; and if, on the other hand, it failed to find a deeper pay, the depth drilled below the lowest producing horizon would then be termed semiwildcat dry footage. For the most part this kind of semiwildcat footage has been omitted from our statistics. It comprises only a small percentage of the whole.

A somewhat similar case is that of a wildcat well drilled through one or more prospective pay zones to a considerably greater depth and then plugged back to completion as a producer. However, in a hole of this kind, since the total depth would be charged against the cost of the completed producer, we have listed this total depth in the column for producers. Our statistics for 1940 do not always designate plugged-back footage, but in the nine states where this information was submitted (including California, Oklahoma, and Texas), the total bottom-hole footage plugged off was shown to be 208,761 ft. in 153 discovery wildcats—not an inconsiderable percentage of the total producer figures.[2]

On the maps (Figs. 1 and 2), numbers in parentheses indicate total footage drilled; figures preceding parentheses indicate the number of holes drilled; figures above the crossline are for producing wells, both oil and gas; and figures below the crossline are for dry holes.

In the states covered in this review, as shown in Fig. 1, and listed in Table 1, during 1940 a total of 10,253,948 ft. was drilled in 3,038 holes, divided as follows:

| | |
|---|---|
| 366 producers | 1,411,530 ft. |
| 2,672 dry holes | 8,842,418 ft. |

*This paper was read by title at the Houston meeting of the American Association of Petroleum Geologists and will be reprinted in the Bulletin of the association for June 1941.

The writer acknowledges with thanks the kind assistance and cooperation of the following gentlemen in compiling data for this summary: A. F. Allison, L. J. Bateman, A. H. Bell, K. E. Born, N. Burnett, G. E. Burton, D. H. Cardwell, C. H. Coldwell, R. J. Cullen, G. F. Fix, M. H. Funk, G. C. Gester, E. A. Koester, C. S. Lavington, G. D. Lindberg, A. M. Lloyd, R. W. Mallory, D. J. Munroe, G. W. Myers, Jack Parker, C. H. Row, G. C. Sleight, L. C. Smith, S. D. Sumerford, and E. B. Wilson.

[1]See Bull. Am. Assoc. Petr. Geol., Vol. 21, pp. 1079-82; Vol 22, pp. 645-48, 1231-35, 1236; Vol. 23, pp. 789-94; and Vol. 24, pp. 953-58.

[2]The reader is reminded that these figures of 153 wells and 208,761 ft. are included in the figures of 366 producers and 1,411,530 producer ft., respectively, in Table 1 (oil-plus-gas wells).

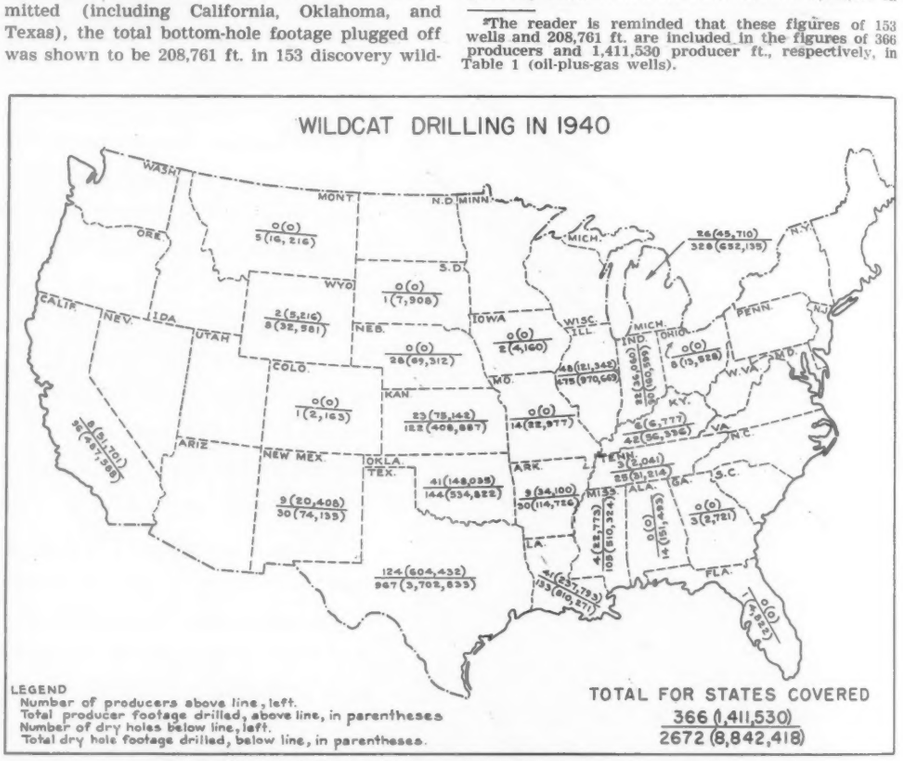



*Fig. 1—Showing footage drilled, number of tests and number of producers*

**TABLE 1—NUMBER OF OIL WELLS, GAS WELLS, AND DRY HOLES, DRILLED AS WILDCATS IN 1940**

| States— | Oil discovery— Number of holes | Oil discovery— Footage drilled | Gas discovery*— Number of holes | Gas discovery*— Footage drilled | Dry— Number of holes | Dry— Footage drilled | Total number of holes | Total footage drilled | Average depth of holet |
|---|---|---|---|---|---|---|---|---|---|
| Alabama | ... | ..... | .. | ..... | 14 | 151,493 | 14 | 151,493 | .... |
| Arkansas | 7 | 16,880 | 2 | 17,220 | 30 | 114,726 | 39 | 148,826 | 3,816 |
| California | 6 | 28,587 | 2 | 23,114 | 96 | 487,588 | 104 | 539,289 | 5,185 |
| Colorado | ... | ..... | .. | ..... | 1 | 2,163 | 1 | 2,163 | .... |
| Florida | ... | ..... | .. | ..... | 1 | 4,822 | 1 | 4,822 | .... |
| Georgia | ... | ..... | .. | ..... | 3 | 2,721 | 3 | 2,721 | .... |
| Illinois | 48 | 121,342 | .. | ..... | 475 | 970,669 | 523 | 1,092,011 | 2,088 |
| Indiana | 17 | 28,600 | 5 | 7,460 | 90 | 160,599 | 112 | 196,659 | 1,756 |
| Iowa | ... | ..... | .. | ..... | 2 | 4,160 | 2 | 4,160 | .... |
| Kansas | 22 | 71,717 | 1 | 3,425 | 122 | 408,887 | 145 | 484,029 | 3,338 |
| Kentucky, West | 6 | 6,777 | .. | ..... | 42 | 56,336 | 48 | 63,113 | 1,315 |
| Louisiana | 27 | 132,930 | 14 | 104,863 | 133 | 810,271 | 174 | 1,048,064 | 6,023 |
| Michigan | 22 | 40,735 | 4 | 4,975 | 328 | 652,135 | 354 | 697,845 | 1,971 |
| Mississippi | 4 | 22,773 | .. | ..... | 105 | 510,324 | 109 | 533,097 | 4,891 |
| Missouri | ... | ..... | .. | ..... | 14 | 22,977 | 14 | 22,977 | .... |
| Montana | ... | ..... | .. | ..... | 5 | 16,216 | 5 | 16,216 | .... |
| Nebraska | ... | ..... | .. | ..... | 28 | 69,312 | 28 | 69,312 | 2,475 |
| New Mexico, Northwest | ... | ..... | .. | ..... | 4 | 10,972 | 4 | 10,972 | .... |
| New Mexico, Southeast | 6 | 14,270 | 3 | 6,138 | 26 | 63,161 | 35 | 83,569 | 2,387 |
| Ohio, Northwest | ... | ..... | .. | ..... | 8 | 13,528 | 8 | 13,528 | .... |
| Oklahoma | 35 | 133,291 | 6 | 14,744 | 144 | 534,822 | 185 | 682,857 | 3,702 |
| South Dakota | ... | ..... | .. | ..... | 1 | 7,908 | 1 | 7,908 | .... |
| Tennessee | 3 | 2,041 | .. | ..... | 25 | 31,214 | 28 | 33,255 | 1,187 |
| Texas | 98 | 461,567 | 26 | 142,865 | 967 | 3,702,833 | 1,091 | 4,307,265 | 3,948 |
| Wyoming | 1 | 1,676 | 1 | 3,540 | 8 | 32,581 | 10 | 37,797 | .... |
| Total | 302 | 1,083,186 | 64 | 328,344 | 2,672 | 8,842,418 | 3,038 | 10,253,948 | .... |

*Gas and distillate wells are included under gas wells.
†Averages have been recorded here only for states where more than 25 holes were drilled in 1940.

This means that 12.05 per cent of the holes drilled, and 13.77 per cent of the footage drilled, was successful in 1940. The average depth of hole was 3,375 ft.

In the southern states district (Fig. 2), in 1940, a total of 6,279,857 ft. was drilled in 1,466 holes, divided as follows:

| | |
|---|---|
| 187 producers | 919,506 ft. |
| 1,279 dry holes | 5,360,351 ft. |

In this area, then, 12.76 per cent of the holes drilled, and 14.64 per cent of the footage drilled, was successful. The average depth of hole was 4,284 ft. For comparison with statistics for this same area in 1938 and 1939, see Table 2.

Selection of the location for a wildcat well may be based on geology (surface geology, subsurface geology, trend along known structural or stratigraphic conditions, local or regional, or shallow exploratory drilling); or it may be based on geophysics (exploration by seismograph, torsion balance, gravity meter, magnetometer, etc.); or it may be based on some nontechnical suggestion or requirement, such as "creekology," "hunch," "doodlebug," promotion, lease obligation, reported showing of oil or gas in holes previously drilled, etc. In many cases the reason for choosing the location cannot be ascertained.

In Table 3 are listed the reasons for drilling the wildcats in 1940, using the best information available from men familiar with such statistics, each in his own state or district. According to these figures, 320 wildcats drilled on technical advice (geology and/or geophysics) were successful (oil or gas), and 1,731 were dry; 35 holes located for nontechnical reasons were producers, and 797 were dry; 11 producers and 144 dry holes were located for reasons unknown. These figures show that 15.6 per cent of the holes drilled on technical advice were producers as contrasted with 4.2 per cent successful in the case of the holes located without technical advice. Therefore, in 1940 locations based on technical recommendations were 3.7 times as successful as those drilled without such advice. In the southern states (Fig. 2), 4.4 per cent of the wildcats, located without technical advice, were producers, whereas 15.0 per cent of the holes located on technical advice were producers.

Comparing last year's figures[3] with figures for 1940, we note the following conspicuous changes:

1. The number of dry holes drilled in Kansas increased from 74 to 122, the dry-hole footage from 258,031 to 408,887 ft., whereas the number of discovery wells remained almost unchanged.

2. In Louisiana there was a gain in discovery wells, from 15 to 41, whereas the number of dry holes increased only a small percentage, from 123 to 133.

3. There was a tremendous increase in drilling in Mississippi, but almost entirely in dry holes, which increased from 16, with a total of 67,195 ft., in 1939 to 105, with a total of 510,324 ft., in 1940.

4. Oklahoma wildcat drilling showed a considerable increase, with 41 producers (148,033 ft.) and 144 dry holes (534,822 ft.) in 1940, as contrasted with 21 producers (82,272 ft.) and 91 dry holes (388,470 ft.) in 1939.

5. Texas had a small percentage gain in dry holes (from 906 to 967) and a small percentage loss in discovery wells (from 131 to 124), with a net gain in wildcats from 1,037 in 1939 to 1,091 in 1940.

6. The number of successful holes (discovery wells) out of the total number of wildcats drilled on technical advice rose from 13 per cent in 1939 to 15.6 per cent in 1940; and on the contrary, successful holes drilled without technical advice decreased from 6 per cent of the total number of wildcats drilled in 1939 to 4.2 per cent of the total number in 1940, thus indicating a decided advantage on the side of technical advice.

7. Last year[4] we called attention to the fact that, whereas in 1937 there were three times as many discovery wildcats drilled on technical advice as there were drilled for nontechnical reasons, in 1938 this factor had decreased to between 2.2 and 3.2, and in 1939 it had further decreased to between 1.5 and 2.2. Reasons were suggested for this condition. Last year, in 1940, we find that this factor has jumped to 3.7. There has been a stronger tendency than hitherto to seek technical advice before selecting a wildcat location, and especially is this true where deep drilling is contemplated.

Our readers may be interested to have a few details, not appearing in the accompanying tables, with reference to the distribution of certain types of technical recommendations applied to locating wildcats during 1940. Seven hundred and ninety-three locations were made on subsurface geology as compared with 155 made on surface geology. Four hundred and thirty-one locations were based on seismograph work, mostly reflection shooting, whereas the remaining 115 locations listed under geophysics in Table 3 were based on the other types of geophysical exploration. Subsurface geology is by far the most important guide for selection of wildcat locations.

[3] "Wildcat Drilling in 1939," by F. H. Lahee, Bull. Am. Assoc. Petr. Geol., Vol 24, pp. 953-58.

[4] Op. cit., p. 958.

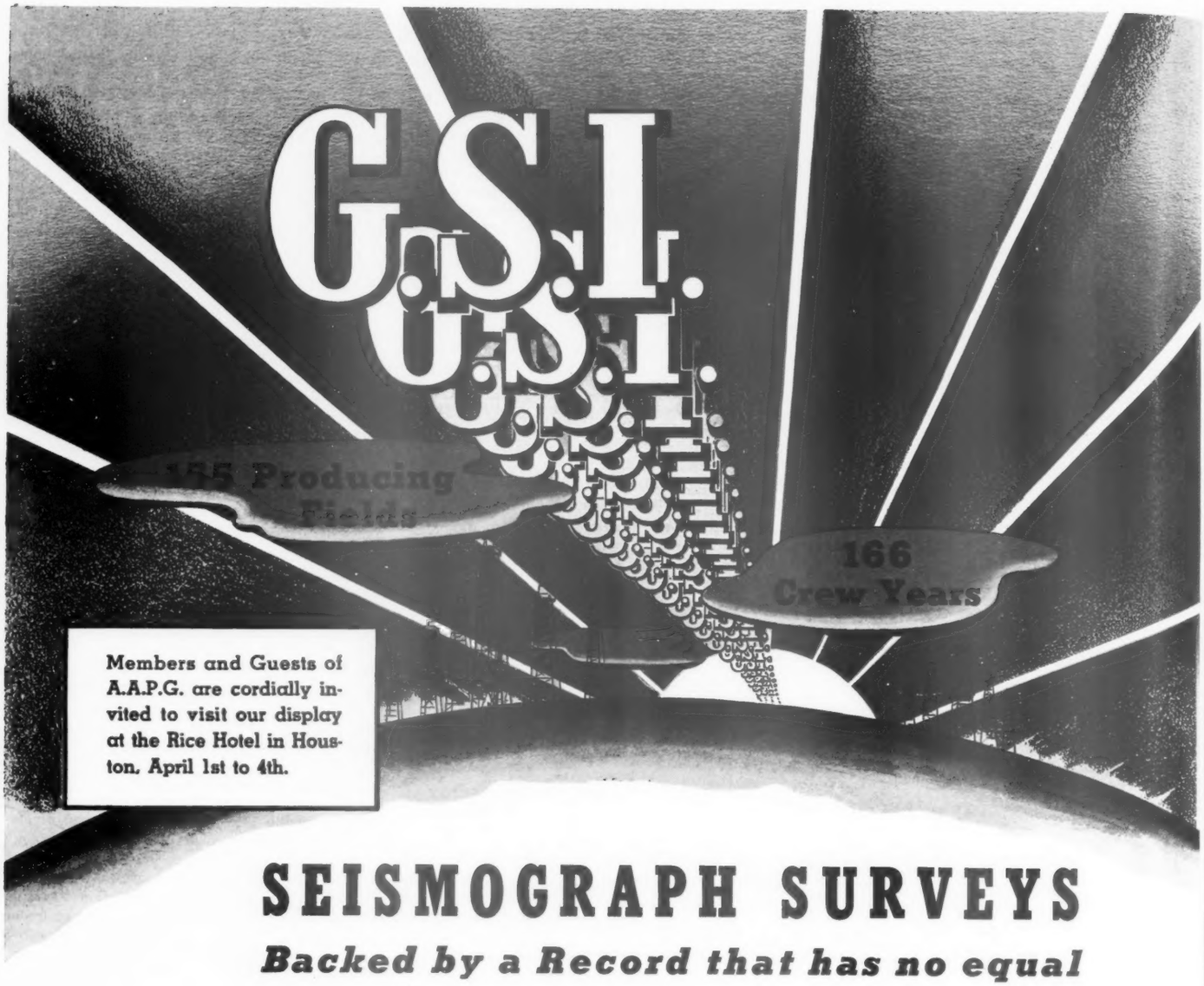
*Fig. 2—Breakdown by sections of the larger producing states in the South*

**TABLE 2—COMPARATIVE STATISTICS FOR ALL STATES SHOWN IN FIG. 2**

| | Producers drilled | | | | Dry holes drilled | | | | Total number wildcats drilled | Average depth of hole (feet) | Number of dry-hole feet drilled for each producer foot |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Holes | | Footage | | Holes | | Footage | | | | |
| | Number | Per cent | Feet | Per cent | Number | Per cent | Feet | Per cent | | | |
| 1938 | 200 | 13.6 | 984,262 | 17.4 | 1,271 | 86.4 | 4,667,402 | 82.6 | 1,471 | 3,842 | 4.74 |
| 1939 | 161 | 12.6 | 779,345 | 14.8 | 1,113 | 87.4 | 4,501,669 | 85.2 | 1,274 | 4,145 | 5.90 |
| 1940 | 187 | 12.8 | 919,506 | 14.6 | 1,279 | 87.2 | 5,360,351 | 85.4 | 1,466 | 4,284 | 5.83 |

**TABLE 3—BASIS FOR LOCATING WILDCATS DRILLED IN 1940**

| State— | Geology | | Geophysics | | Geology and geophysics | | Sundry nontechnical | | Unknown | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Prod. | Dry | Prod. | Dry | Prod. | Dry | Prod. | Dry | Prod. | Dry | Prod. | Dry |
| Alabama | .. | 1 | .. | 1 | .. | 2 | .. | 10 | .. | .. | .. | 14 |
| Arkansas | 5 | 8 | 4 | 9 | .. | .. | .. | .. | .. | 13 | 9 | 30 |
| California | 5 | 45 | 2 | 10 | 1 | 13 | .. | 27 | .. | 1 | 8 | 96 |
| Colorado | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 |
| Florida | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 |
| Georgia | .. | .. | .. | .. | .. | .. | .. | 3 | .. | .. | .. | 3 |
| Illinois | 12 | 140 | 32 | 107 | 1 | 11 | 2 | 168 | 1 | 49 | 48 | 475 |
| Indiana | 10 | 47 | 1 | 4 | 6 | 7 | .. | 12 | 5 | 20 | 22 | 90 |
| Iowa | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | 2 |
| Kansas | 12 | 41 | 3 | 12 | 1 | 5 | 7 | 64 | .. | .. | 23 | 122 |
| West Kentucky | 6 | 33 | .. | .. | .. | .. | .. | 9 | .. | .. | 6 | 42 |
| Louisiana | 23 | 66 | 18 | 61 | .. | 1 | .. | 4 | .. | 1 | 41 | 133 |
| Michigan | 15 | 159 | .. | 1 | .. | .. | 9 | 156 | 2 | 12 | 26 | 328 |
| Mississippi | 3 | 16 | 1 | 43 | .. | 1 | .. | 45 | .. | .. | 4 | 105 |
| Missouri | .. | 3 | .. | .. | .. | .. | .. | 3 | .. | 8 | .. | 14 |
| Montana | .. | 4 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 5 |
| Nebraska | .. | 8 | .. | 1 | .. | .. | .. | 19 | .. | .. | .. | 28 |
| New Mexico | 6 | 20 | .. | 1 | .. | .. | 3 | 7 | .. | 2 | 9 | 30 |
| Ohio (Northwest) | .. | .. | .. | 2 | .. | .. | .. | 3 | .. | 3 | .. | 8 |
| Oklahoma | 23 | 56 | 12 | 30 | .. | .. | 5 | 54 | 1 | 4 | 41 | 144 |
| South Dakota | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 |
| Tennessee | 3 | 4 | .. | .. | .. | 2 | .. | 17 | .. | 2 | 3 | 25 |
| Texas | 73 | 549 | 27 | 162 | 13 | 37 | 9 | 194 | 2 | 25 | 124 | 967 |
| Wyoming | 2 | 2 | .. | 1 | .. | 2 | .. | 1 | .. | 2 | 2 | 8 |
| Total | 198 | 1,204 | 100 | 446 | 22 | 81 | 35 | 797 | 11 | 144 | 366 | 2,672 |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# Structural Trends on Gulf Coast Of Texas and Louisiana

By W. P. JENNY
Geologist and Geophysicist, Houston, Tex.

DURING the past few years magnetic methods have been developed into a highly effective means of prospecting for both regional and local structures. The progress of the magnetic methods has been brought about mainly by increasing the accuracy of the field work and by introducing the stratigraphic conception into the interpretation of magnetic anomalies.

As indicated in Fig. 1, we know now from experiments as well as from actual experiences that some of the sedimentary strata contain magnetic material in considerable quantity and that thickening and thinning as well as structural displacement of such beds may create magnetic anomalies.

Wherever the igneous basement complex lies at considerable depths and magnetic beds occur within the overlying sedimentary column, it is safe to assume that the magnetic anomalies should be interpreted as caused by such sedimentary strata.

This condition exists in the Gulf coastal area of Texas and Louisiana. The extended positive magnetic trend *VIII* (Fig. 2), which runs parallel to and some 50 miles inside of the coast line of the Gulf of Mexico, is therefore interpreted as caused by a thickening of magnetic sedimentary beds, possibly of Wilcox and younger age. Negative trend *IX* should consequently be interpreted as caused by a thinning of the magnetic beds on top of a deep-seated anticlinal structural trend.

Purely theoretically it might be possible to interpret trend *VIII* as the southern or lower line of folding along a regional flexure; along this line the magnetic beds would have reached an optimum thickness and depth for maximum magnetic intensity; southward from trend *VIII* the magnetic intensity would decrease on account of a continuously increasing depth of the southward dipping magnetic beds. The positive areas *J* (Atchafalaya) and *N* (Corpus Christi) are, however, fairly generally recognized as structural basins and thus tend, together with other reasons, to discredit this possible interpretation.

It is interesting to note the large percentage of piercement-type domes in the general area of the Damon Mound and Vinton domes. The first area is located between the depressions *L* and *M*, the second between the depressions *L* and *K*. We find the same high percentage of piercement-type domes to the north and south of trend *VIII* between Houston and Beaumont and along trend *IX*, especially in Brazoria and Matagorda counties.

Along negative trend *VII* are located the structures of South Crowley, Abbeville, and Erath. All three appear from subsurface correlations as broad and high local uplifts; they also act very similarly as far as production is concerned. From the regional magnetic data it seems possible to explain the high structural position of these fields

*(Continued on Page 49)*

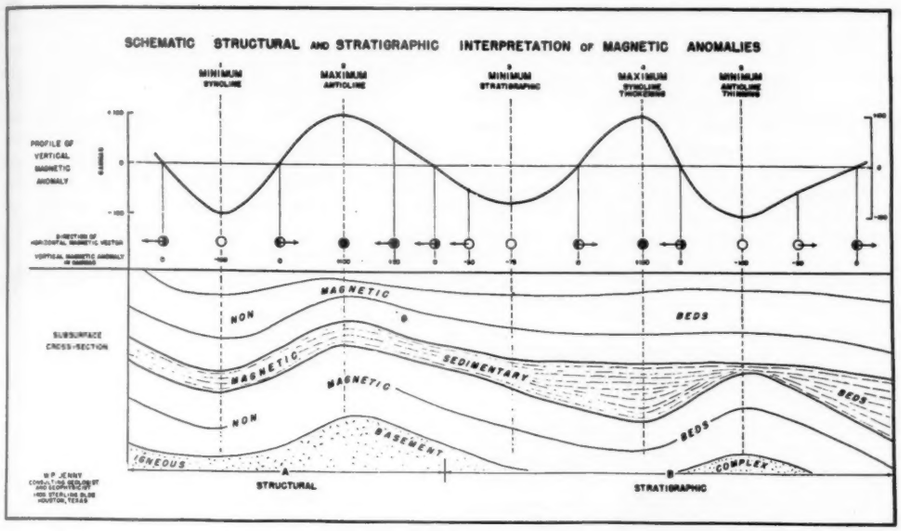



*Fig. 1—Left*

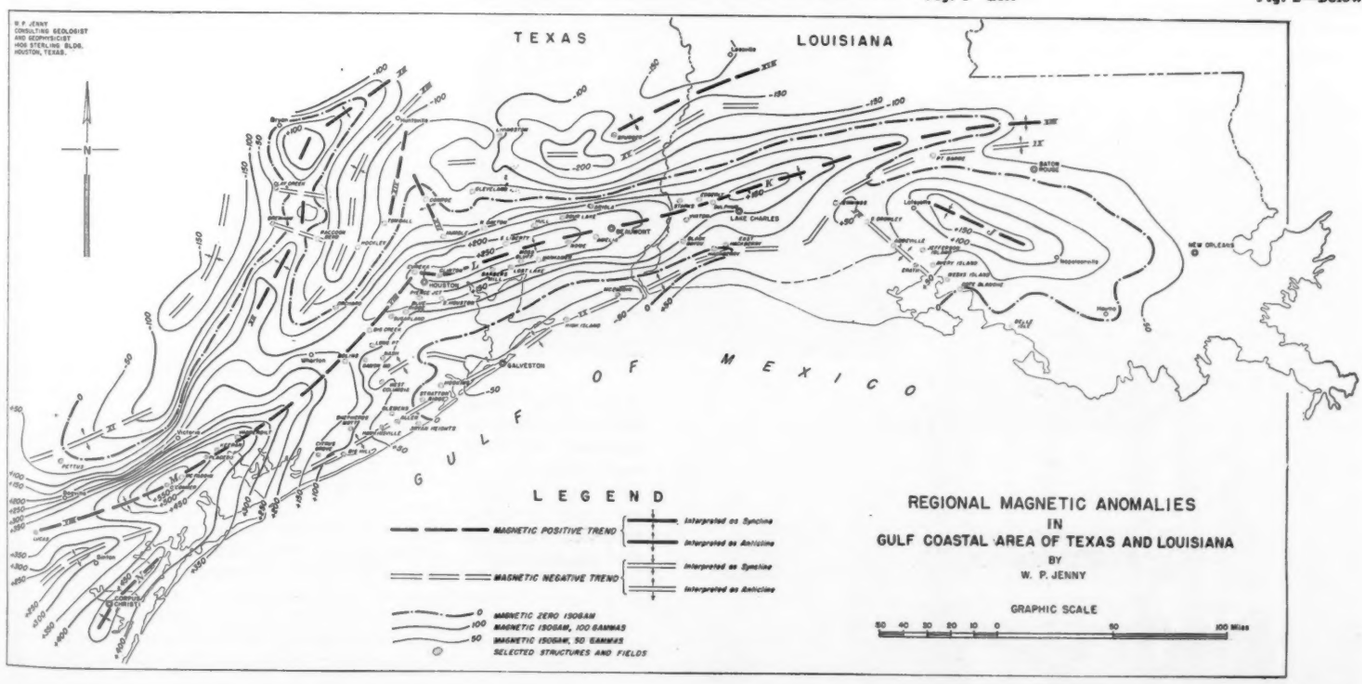



*Fig. 2—Below*

# Exploration Methods Combine Old and New Practices

By W. V. HOWARD

GEOLOGY today has so many ramifications that the nonspecialist is likely to be bewildered by the different phases which he apparently needs to know if he is to undertake an exploration project in a scientific manner. In the first place, he finds that geological associations affiliated with the oil industry divide themselves into three groups. One is an association of geologists, another consists of geophysicists, and a third is composed of paleontologists and mineralogists. The proceedings of each society include a number of papers which are unintelligible to him and, possibly, some which deal with problems which he does not consider to be problems at all. At any rate, he feels that they should not be problems to the professional geologist. He is apt to feel that if an association of geologists has to devote a considerable part of each meeting to a discussion of the origin and evolution of oil, or to the migration and accumulation of oil, it is a case of the blind leading the blind.

Actually, many of the so-called "fundamentals" of geology are not known and will not be known for many years. Yet geologists are able to proceed on the basis of a partial knowledge of the fundamentals and find many oil fields. More and more, many geologists are compelled to specialize in certain narrow fields, while others are required to broaden their knowledge so as to embrace the results of research in these fields in a general plan of prospecting. Hence, the societies of geophysicists and of economic paleontologists and mineralogists and hence, also, the joint meetings of the three groups.

So the practical oil man needing professional assistance either hires a geologist or calls in an exploration company to shoot the area, run a soil analysis or what not. Sometimes he is satisfied and sometimes he is not.

In a recent communication, Joseph L. Adler, president of Independent Exploration Co., points out that "for the so-called practical oil man the most difficult problem is the selection of the proper exploration method for any particular project. He also has difficulty in getting competent advice on the matter because every authority is more or less of a specialist today, and consequently is prejudiced by habit, and often through pecuniary interest, in favor of the use of his own specialty to solve all exploration problems.

"I should say that in general the accuracy of the respective methods increases as the cost increases. Thus, if we list methods in order of increasing cost, we are listing them also in order of increasing accuracy in regions of average geological conditions. This order is about as follows:

"1. Geological interpretations of logs obtained from wells drilled by others.

"2. Surface geology (where possible).

"3. Magnetic surveys and/or electrical surveys (in the limited areas where they work).

"4. Gravity surveys and/or soil analysis.

"5. Regional core drilling.

"6. Seismic surveys.

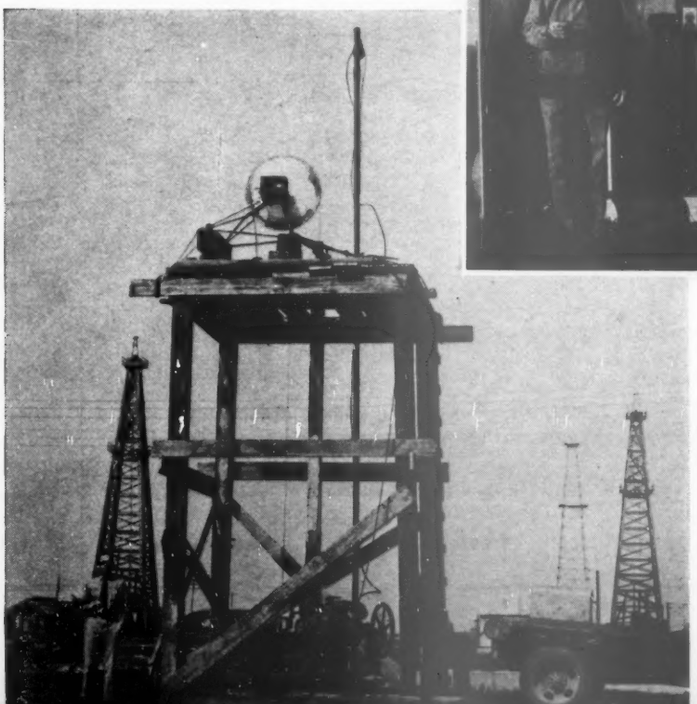
"7. Intensive core drilling with electrical and geochemical logs.

"8. Drilling for production development.

"In general, a program of exploration will give best results if it begins with one of the cheaper methods, which is then followed by one or more of the more refined methods, each subsequent method serving to eliminate more unlikely acreage and limiting more closely the territory in which wildcat wells should be drilled. Just which method is used to begin the campaign and which of the successive methods are omitted during its progress depends on many factors."

To this general statement one may raise objections, but, as a rule, those objections are answered in the statement itself. For example, if one has complete sets of samples from wells drilled by others, a study of these samples may give much more accurate results than other methods listed lower in the table. However, the cost of such a study is also greater than that of other methods, even though that cost was not all borne by one individual. It is obvious that the cheapest method, and one which would give very complete information, would be to steal a report containing the result of several years' work. That would not reduce the cost of the study, however, but would merely reallocate the proportion of costs borne by the different interested parties. Thus; one important factor is the accuracy and completeness of information already available, which more or less conforms to the amount of money which has already been spent in the area.

It should be noted, moreover, that Mr. Adler refers to "regions of average geological conditions." Variations from this average are numerous. They may almost be said to be the rule. Each variation may alter this relationship between cost and accuracy, especially in the methods which do not involve drilling. Some factor may eliminate one method entirely as being of no value regardless of cost. Like almost every other geological rule, experience added to a general knowledge of conditions in the area to be studied and the use of exploratory methods in similar areas is necessary if it is not to be applied blindly.



*Above: Large torsion balance in aluminum observation hut (Courtesy H. Klaus)*
*Left: Making gamma-ray survey of well at Spindletop (Courtesy Well Surveys, Inc.)*

### Surface Structures Not All Found

For many years we have been hearing that the easily found surface structures have all been located and that more refined methods are necessary for efficient exploration. The truth of this statement can be judged on the strength of two examples chosen at random from many. Near Tinsley, Miss., two outcrops of bentonite were found at the same level 9½ miles apart downdip. This indicated, at least, a terrace. Later an outcrop of Moody's Branch marl was observed between these bentonites, which indicated a structure with at least 135 ft. of closure. Drilling followed and the first major field in the southeast was the result.

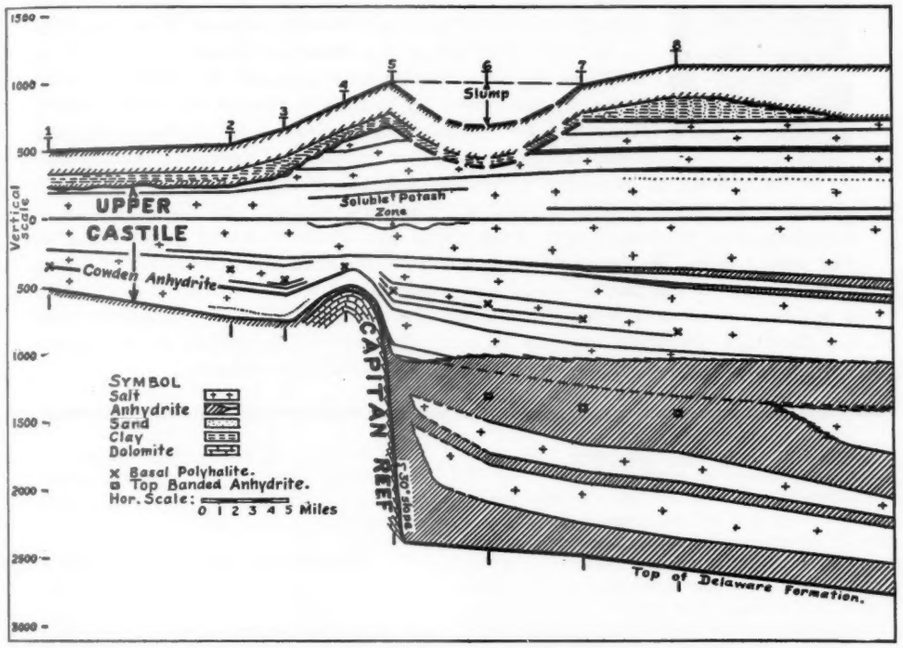
If objection is raised that this was in a new area, the second example may be of interest. A few miles west of the Hogshooter pool in Washington County, Oklahoma, surface outcrops show a structure. This structure was drilled, produced and the wells abandoned prior to 1930. Today, three wells on this structure are producing gas from four different sands at depths ranging from 685 to 1,400 ft. That structure had been found all

right, but the early operators appear to have missed some bets.

Osage and Wagoner counties, Oklahoma, have been combed over for oil and gas for nearly 40 years, yet maps of these counties show the existence of almost as many undrilled as drilled structures. Why should these old areas still contain untapped reserves? Why should Okfuskee County be the most active wildcat territory in Oklahoma today when it has been prospected for 30 years or more? A communication from L. G. Huntley, a consulting geologist with many years of experience in many lands, supplies a good deal of the answer. He says, in part: "Keep the fundamentals in mind: (*a*) Evidence of good oil sources; (*b*) evidence of a favorable stratigraphic section; (*c*) evidence of favorable structural traps of various types. Don't allow details to obscure the main issues. When enough evidence has been collected, then try to draw up a balance sheet, in the light of background experience in other fields, upon which a reasonable estimate can be made as to comparative chances—present risk against future dollars.

"In the course of gathering such evidence, there may be called into use all sorts of surveying methods and various kinds of notes, depending upon the geologist's habits and the type of country in which he is working. I have in more recent years flown over much country which I had once covered on foot, muleback and dugout canoe. Previous methods can be supplemented by better tools and facilities today. Geophysics is one of such tools. However, I have seen major companies shoot large areas in the Appalachians before drilling, only to find that previous structural work was more accurate than their shooting pictures. Incidentally, their geological personnel seemed to include a lot of subsurface men, but not one who was capable of doing a good job of surface mapping. Let's keep our sense of relative values in exploration methods. Fashions come and go and many of them leave valuable lessons behind. But there does not seem to be any substitute for actually getting into the field on foot and gathering the evidence at first hand. Many a chief geologist for a major company knows this. But where today can you get young fellows with this experience? There is little surface work going on in American fields. All the junior crowd are in for subsurface work and geophysics. I don't think subsurface geologists who lack the background of field work will ever see a problem in the same light as one of the older crowd."

Men of Mr. Huntley's experience are far from recommending a "back to Methuselah" movement. They merely realize that new methods tend to crowd out the old instead of supplementing them. There is evidence that geophysicists employing the latest refinements of their science are joining the old-time geologists in their respect for knowledge of the surface. All that is necessary to learn one fundamental difference between surface and subsurface methods is to walk well-exposed outcrops on a mountain front and then compare the observations made with subsurface logs over a comparable distance. In one case, the formations may vary within a considerable vertical range and also many beds grade laterally from one facies into another. Limes become shaly, shales grade into sands. Unconformities of limited extent cut out formations and sand lenses may be introduced. Sections of the same formation often show such startling changes in lithology and fossil content that several geologists are kept busy for months straightening them out.




*Great lateral variation found in Southeast New Mexico is illustrated here by a cross-section. This condition is also readily observable on outcrop. (A.A.P.G. Bulletin)*

## Subsurface Variations Hard to Find

But in the subsurface it all becomes simple. Formations cross counties in regular sequence like the old Wernerian "layers of an onion" theory. The search is all for tops. If the well is running high, all is well and the non-oil-bearing section is described and forgotten. A little sand is mentioned, but the possibility of that sand leading updip to a sand reservoir may not be noticed. If an unsuspected pay is brought in that other higher wells did not pick up. it is labeled a "stratigraphic trap" and if enough stratigraphic traps show up we have a "trend."

Much geological and geophysical effort today is directed towards projecting the lessons learned on the surface into the subsurface. Failure of visual methods to note lithologic changes has led to great advances in core analysis, electrical and radioactive logging and the developing field of geochemical logging. When methods of geophysical prospecting do not work locally or appear to be superseded by other methods, much study is devoted to those conditions which prevent complete efficiency. In most cases, structural, depositional or lithologic irregularities are the cause.

When the concept of beds of more or less uniform thickness and with more or less uniform magnetic properties was applied to magnetometer surveys, they did not work, except locally. If it is realized that all magnetism is not related to a granite basement and that magnetic highs may reflect a thick magnetic bed in a syncline as much as the granite, the magnetometer is a long way toward being more widely and effectively used.

So long as the torsion balance was used to obtain total gravity and to detect the more obvious gravity anomalies associated with salt domes and other large uplifts, its usefulness was greatly restricted. For this work it is now replaced by the cheaper and faster gravimeter. Now, according to Dr. H. Klaus, "the torsion balance is being used for the mapping of subsurface features which the gravimeter is not sensitive enough to detect. . . . At present, two torsion-balance parties are busy in the Permian basin of West Texas and New Mexico, mapping the facies changes or gradations from basin type to platform type of section which largely control productivity in that sector. Recently, one of these parties was occupied in mapping the details of buried topography around an old uplift in southern Oklahoma, with a view to testing the oil possibilities of these buried hills." The nature of such gradations can be studied on outcrop in many parts of the country.

## Rechecking Fundamentals

Much work is being done with the seismograph in shooting known sections in order to determine the effects of minor variations in sediments. Meanwhile, the American Association of Petroleum Geologists has active committees at work unraveling problems of sedimentation, local geological societies are conducting field trips, sometimes of a week's duration, in which surface exposes are studied, and geologists everywhere are busily interpreting what they see underground in terms of surface geology.

To return to our practical oil man. He is prone to have a number of ideas of what he thinks is geology implanted in his mind. The geologist or geophysicist employed by him has more difficulty in dealing with these theories than with the problem at hand, which is to conduct an exploration project with the information available, using the most effective known methods for the region; he also must have a broad enough general knowledge of rock formations to enable him to interpret and evaluate the results of the methods used. The operator, in turn, must also be willing to see that it takes a lot of research to cost as much as a dry hole and that while competitors may jump in and uncover an oil pool by drilling blindly, they won't do it often enough to keep out of the hands of their creditors as a general rule.

Today, there are many pools which can be found by a combination of old and new methods of surface exploration in the midst of densely drilled areas. Others require detailed study, sometimes lasting over many months before they can be uncovered. The operator must indeed balance "present risk against future dollars." The geologist, on the other hand, must "keep his sense of relative values in exploration methods," and the geologist of the future would be well advised to forget specialization along too narrow lines until he knows enough old-fashioned surface geology to be able to know what he has found out when he has completed a survey.

# THE FIFTH DIMENSION . . . in the Oil Industry

By J. EDGAR PEW

**J. Edgar Pew, vice president of the Sun Oil Co. in charge of its producing operations, has been honored repeatedly for his contributions to the oil industry. His active interest and participation in efforts to standardize equipment, starting in 1920, is conceded the most important factor in success of the program.**

**He was president of the American Petroleum Institute in 1925 and 4 years ago he was awarded the Anthony Lucas Medal by the American Institute of Mining and Metallurgical Engineers for "distinguished achievement in improving the technique and practice of finding and producing petroleum."**

**In his address as presented before the A.A.P.G. at Houston, Mr. Pew found it necessary to invent a fifth dimension "What is—yet ain't" as the best way of describing how geologists have gone ahead and discovered vast quantities of oil that wasn't there. He recommended that the association adopt Elijah as its patron saint because of the prophet's efficiency with regard to oil production using only a widow's cruse as a reservoir. The parallel between this early experiment and the American geologists' success in increasing reserves faster than the rate of production should, according to Mr. Pew, be more widely recognized.**

THE oil industry, and the geological profession in its relationship to that industry, are both getting unwonted attention just now because of the supreme importance of oil in a world at war. More than almost any other natural resource, the supplies and distribution of oil are at this moment affecting the destiny of nations, the course of history. I think it is not too much to say that our very hopes for the future of civilization largely depend on our success in developing, producing and manufacturing a product that is difficult to find, difficult to produce, and difficult to reduce to its best values for use. Yet I know of no industry that has met the demand of an ever-increasing consumption and the need for constantly better quality of product, as has the oil industry. So I am going to speak briefly of the military and civic need for our product, and of our provisions for meeting these needs. The subject naturally falls into four divisions: First, the adequacy of supplies; second, of transportation; third, of manufacturing facilities; and finally, the general efficiency of the industry and its record as an employer.

If over the last 20 years we had been looking forward to the war emergency which now confronts us, we could hardly have planned to meet that emergency with more confidence than we now feel. When we entered the first World War there was ground for some apprehension about petroleum supplies. At that time this country was producing about 900,000 bbl. daily; now it is producing four times that much. At that time we were using it as fast as we could get it out of the ground; today we have a constant struggle to keep production from outrunning demand. By the mere opening of valves we could overnight add 30 per cent to present production. I am advised that this would take care of any extraordinary requirements due to war conditions, in addition to providing for probable ordinary public needs, for a period of 2 years. And if after the 2 years had expired there should still be need for continuing production at this increased rate, I have every reason to believe that it can and will be done, and done without violating reasonable conservation practice. The whole history of the industry justifies the expectation of continually increasing production when it is needed. There are hundreds, possibly thousands, of locations for wells yet to be drilled in known producing areas, while new discoveries are also to be expected from many known but as yet undeveloped structures. In addition, the discovery of new structures can be confidently anticipated.

In 1917 reserves in the ground were estimated at 4,000,000,000 to 5,000,000,000 bbl. Today, known reserves, largely developed by the drill, are about 20,000,000,000 bbl. These reserves are for the greater part still in the ground, which is most fortunate; that is the best possible place for them, both to preserve quality and to protect against any kind of attack. A thousand, yes 5,000 wells could be destroyed, if that were possible, without affecting a single barrel of our reserves, and without materially affecting available supplies or our ability to meet all requirements.

Present policies and methods look to crude-oil production in such manner that the greatest ultimate recovery will be had. That is the true program of effective conservation, and far be it from me to advocate any departure from such a policy. Nevertheless, in an emergency such as war might present, some producing regulations might have to be temporarily suspended or modified in order to meet all demands. But even in such an exigency, present methods are best adapted to meet requirements with minimum violation of best producing practices, and most surely to produce the best results.

### Efficiency of Oil Transportation

Now, a word about transportation. The oil industry, I believe, is the only one that has developed its own complete and unique transportation system. It is the cheapest transportation ever

*L. C. SNIDER*
*President, American Association of Petroleum Geologists*

*JOHN M. VETTER*
*Vice pres., American Association of Petroleum Geologists*

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devised, and its economic importance, I think, is fully recognized by but few people in the industry, and by almost nobody outside of it. This is most unfortunate; there is need, pressing need, for a thorough study and general understanding of the economics of transportation as a factor in this industry.

Petroleum, like gold, is where you find it; and you usually find it in out-of-the-way places. I venture that if petroleum had to be moved by conventional transportation facilities, from the oil fields to the refinery, and, if its products had to be moved to market by those same facilities—the cost would be so great that a major share of the world's oil fields would never have been developed. Even as it is, something like 40 per cent of the cost of the gasoline you put into your car at the filling station represents transportation. Without the pipe-line, the tank-ship, tank-car and tank-truck transportation system that the industry has built up, that additional cost would have been multiplied several times, to a point where the price when it reaches the consumer would be so great that few could afford to buy it. That, of course, would mean that all the wide range of other industries that are dependent on cheap petroleum and petroleum products could never have been developed at all. We would have thousands of motor cars where we now have millions; we would have hundreds of miles of modern highways, where we now have thousands of miles.

Our pipe lines, tank ships, tank cars and tank trucks round out a complete system to handle the raw materials and the products of this industry: a system that is not fitted to serve any other industry or any other transportation requirement. Consider the pipe lines. They serve as outlets to particular oil fields, or as feeders to particular refining plants, or as both. With the development of oil fields in new and remote areas, and the construction of new refineries, there has thus been built up a great transportation system that is the life line of the industry. It is of importance alike to the producers from hundreds of thousands of wells, to the refiners who have invested millions in the faith that the pipe lines would bring them oil, and to the millions of consumers. The refinery is so dependent on a continuous supply of crude that no course is left to it but to finance and build its own pipe line and to keep on building more as its needs require and as the sources of crude supply change. The pipe line is indispensable to the refinery; the pipe line's ability to supply the needed crude is so dependent on its extension whenever and wherever the oil is available, that the pipe line has been properly considered a refinery facility. The larger the refinery, the more urgent its need for a never-failing supply of crude. This can be assured only through the operation and control of the constantly expanding pipe-line system. That system, again, assures to the thousands of independent producers a constant outlet for their oil and a competitive market for it. Being assured of this outlet and this market, the wildcatter on whom at last we must depend for maintenance of our supplies, can carry on his operations with complete confidence.

### Pipe-Line System Adequate

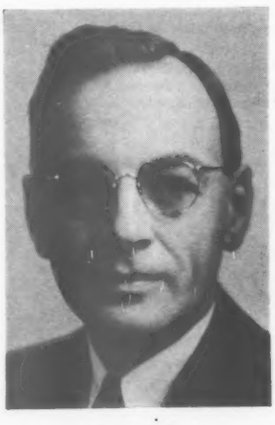
On this basis we have built up in this country a pipe-line system that reaches to every oil field, however remote, and connects these fields with refining and consuming centers all over the land; while by way of tank ships we reach the centers of refining and consumption all over the world. In any emergency these facilities can be expanded quickly and at comparatively small expense. Pipe-line capacities can be increased cheaply by looping lines or putting in additional pumping stations, or both. This can be done when and where the need requires, and to the extent required by the emergency, and capacity increased only if the need is developed. Most of the necessary tankage has already been built along the trunk lines. Telegraph lines, rights-of-way and many other necessary adjuncts already exist.

Popular ignorance about the industry's transportation system is reflected in a recent newspaper item suggesting the building of a pipe line of large capacity from the Texas-Louisiana oil field to some place on the north Atlantic coast, perhaps as far north as Portsmouth, N. H. This is just one of the multitudinous projects inspired by hysteria about national defense. There is no need for such a line, which would merely be a duplication of facilities already in existence and which can be easily expanded. It would present an enormous and unnecessary demand on our iron and steel industries, and would spell the waste of a vast amount of money that ought to be invested in practical and necessary projects. It is highly important that ill-considered proposals of this kind be carefully analyzed in relation to facilities already in existence and adequate to render all the service required. Both as to the supply of oil and as to its transportation, the industry is in far better shape than ever before and if left to handle its problems with a minimum of government interference it can guarantee good and satisfactory performance.

### Refineries Can Meet Emergency

I shall not attempt here to analyze the refining situation. Refining capacity to meet any emergency demand already exists. True, some of it is termed obsolete or obsolescent, but in emergency it would serve its purpose more promptly and at far less expense than a big program of new construction. Nor do I think we need be concerned because so many of these plants are located on or near the seaboard. Certainly the Gulf Coast refineries, at least, will be well protected by the new system of island defenses for which we have recently acquired concessions from Great Britain. When this chain of air and naval bases is completed, it will in effect convert the Gulf and Caribbean areas into inland seas, and refineries on the Gulf will be thoroughly protected. We are building new munition plants, aircraft factories, machinery and equipment establishments within these same seaboard zones, where they are no less vulnerable to enemy attack than are the oil refineries. Moreover, there are sound reasons for the location of a large proportion of our refining capacity along the coast. Transportation is better there, and products are needed there; and finally, even if refined in the interior, the products would have to be stored in great quantities along the

*(Continued on Page 67)*



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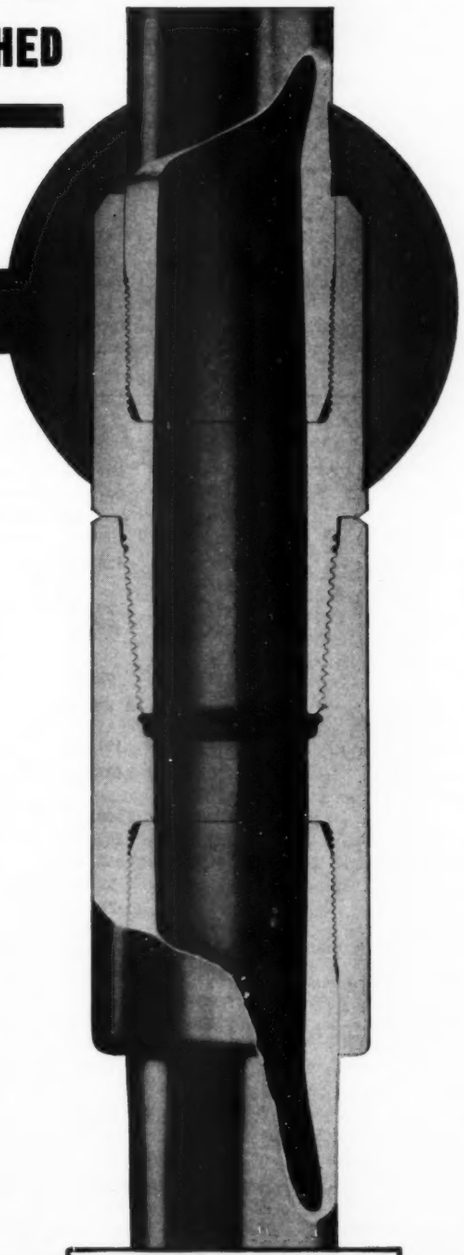

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# Over Three-Fifths of Nation's Oil Reserves in Flush Fields

By W. V. HOWARD

PROVEN oil reserves in the United States as of January 1, 1941, were estimated by The Oil and Gas Journal to be 20,099,258,000 bbl. This estimate can be further resolved into an estimate of reserves in fields of different types. In the accompanying table, it is shown that 3,376,914,000 bbl., or 16.8 per cent of the total, are in partially developed fields. This compares with 4,104,386,000 bbl., or 20.8 per cent of the total as of January 1, 1940.

The relative decline in these partially developed fields was to be expected from the fact that The Oil and Gas Journal's estimate showed that discoveries and extensions in 1940 failed by 20,774,000 bbl. to equal the year's production and, at the same time, the year was one of the most active in the industry's history. The greater part of this activity consisted of drilling up flush fields discovered during the previous 2 or 3 years.

Of the different types of fields, these partially developed areas offer the greatest opportunity for differences of opinion as to ultimate recoverable reserves. In some areas, such as West Texas, a few wells scattered over a large structure such as Slaughter may be considered as proving the whole area while a similar distribution of wells on the Gulf Coast would indicate the presence of a number of separate pools. At the same time, it must be remembered that reserve estimates on partially developed areas are subject to considerable revision. Past experience has shown that this revision is normally upward. This is shown, to some extent, by the ratio between newly discovered reserves in new fields and new sands, and extensions. In 1939, 82 per cent of the new reserves were in extensions to known fields, while in 1940 this ratio was reduced to 73.4 per cent.

The greatest reserve in partially developed fields is in West Texas where nearly 50 per cent of the country's total is concentrated. This district is hampered to some extent by low prices and low allowables so that there is a tendency to delay drilling as long as possible. This is made practicable by the existence of large leases, ranging from single sections up to large ranches. Among the fields included are Wasson, Slaughter, Semi-

## ESTIMATED RESERVES BY TYPE OF FIELD

| | Estimated reserves as of Jan. 1, 1941* | Group 1, partially developed fields* | Group 2, flush and and semi-flush fields* | Group 3, fields on settled production* | Percentage | | | Years' supply | | | Per cent of total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Group 1 | Group 2 | Group 3 | Jan. 1, 1941 | Jan. 1, 1940 | Jan. 1, 1939 | Jan. 1, 1941 | Jan. 1, 1940 | Jan. 1, 1939 |
| California | 3,502,357 | 172,970 | 2,077,387 | 1,252,000 | 4.9 | 59.4 | 35.7 | 15.6 | 15.4 | 12.7 | 17.4 | 17.6 | 17.4 |
| Southern | 998,499 | ..... | 577,972 | 420,527 | ... | 57.9 | 42.1 | 9.2 | 7.9 | 6.6 | 5.0 | 4.6 | 4.6 |
| Coastal | 467,251 | 22,250 | 240,380 | 204,621 | 4.8 | 51.4 | 43.8 | 16.3 | 17.3 | 16.9 | 2.3 | 2.4 | 2.5 |
| Northern | 2,036,607 | 150,720 | 1,259,035 | 626,852 | 7.4 | 61.8 | 30.8 | 23.3 | 24.9 | 19.7 | 10.1 | 10.6 | 10.3 |
| Montana | 81,617 | ..... | 62,274 | 19,343 | ... | 76.3 | 23.7 | 12.4 | 15.1 | 19.1 | 0.4 | 0.4 | 0.5 |
| Wyoming | 268,649 | 72,681 | 92,081 | 103,887 | 27.0 | 34.3 | 38.7 | 10.2 | 13.1 | 14.4 | 1.4 | 1.4 | 1.5 |
| Colorado | 22,764 | 4,390 | 8,084 | 10,290 | 19.3 | 35.5 | 45.2 | 16.2 | 15.5 | 15.7 | 0.1 | 0.1 | 0.1 |
| Utah | 16 | ..... | ..... | 16 | ... | ... | 100.0 | 8.0 | 9.0 | 10.0 | 0.0 | 0.0 | 0.0 |
| New Mexico | 700,098 | 136,067 | 559,103 | 4,928 | 19.4 | 79.9 | 0.7 | 18.1 | 18.7 | 18.7 | 3.5 | 3.6 | 3.7 |
| Texas | 11,238,439 | 2,487,954 | 7,868,571 | 881,914 | 22.1 | 70.0 | 7.9 | 23.0 | 22.2 | 21.7 | 55.9 | 54.8 | 56.1 |
| Panhandle | 697,512 | ..... | 697,512 | ..... | ... | 100.0 | ... | 26.7 | 29.5 | 30.4 | 3.5 | 3.7 | 4.1 |
| West | 2,679,338 | 1,600,429 | 928,157 | 150,752 | 59.7 | 34.6 | 5.7 | 32.2 | 31.1 | 30.6 | 13.3 | 12.5 | 12.0 |
| North | 720,736 | 205,820 | 333,681 | 181,235 | 28.6 | 46.3 | 25.1 | 18.6 | 19.6 | 21.4 | 3.6 | 3.2 | 2.9 |
| West Central | 144,432 | 15,237 | 83,752 | 65,443 | 10.6 | 44.1 | 45.3 | 13.8 | 13.9 | 8.8 | 0.7 | 0.7 | 0.7 |
| East | 3,146,544 | 22,440 | 3,099,171 | 24,933 | 0.7 | 98.5 | 0.8 | 18.8 | 16.1 | 16.2 | 15.7 | 14.6 | 16.7 |
| South | 289,723 | 77,075 | 48,534 | 164,114 | 26.6 | 16.8 | 56.6 | 10.6 | 8.8 | 8.0 | 1.4 | 1.2 | 1.3 |
| South Central | 61,974 | 240 | 20,311 | 41,423 | 0.4 | 32.8 | 66.8 | 8.0 | 6.5 | 7.1 | 0.3 | 0.3 | 0.3 |
| Lower Gulf | 816,528 | 64,709 | 722,694 | 29,125 | 7.9 | 88.5 | 3.6 | 18.6 | 19.0 | 17.9 | 4.1 | 4.4 | 4.3 |
| Upper Gulf | 2,681,652 | 502,004 | 1,954,759 | 224,889 | 18.7 | 72.9 | 8.4 | 32.3 | 37.7 | 34.1 | 13.3 | 14.2 | 13.8 |
| Louisiana | 925,975 | 235,807 | 503,335 | 186,833 | 25.5 | 54.5 | 20.0 | 8.9 | 9.4 | 7.9 | 4.6 | 4.5 | 4.0 |
| Gulf Coast | 743,735 | 210,312 | 409,351 | 124,072 | 28.3 | 55.0 | 16.7 | 9.4 | 10.3 | 8.2 | 3.7 | 3.6 | 3.0 |
| North | 182,240 | 25,495 | 93,984 | 62,761 | 14.0 | 51.6 | 34.4 | 7.4 | 6.8 | 6.9 | 0.9 | 0.9 | 1.0 |
| Arkansas | 329,651 | 10,035 | 224,566 | 95,050 | 3.1 | 68.1 | 28.8 | 12.7 | 14.5 | 9.5 | 1.6 | 1.6 | 1.0 |
| Mississippi | 44,415 | ..... | 44,415 | ..... | ... | 100.0 | ... | 10.4 | 7.4 | 0.0 | 0.2 | 0.0 | 0.0 |
| Oklahoma | 1,183,629 | 45,320 | 462,381 | 675,928 | 3.8 | 39.1 | 57.1 | 7.9 | 8.4 | 8.3 | 5.9 | 6.5 | 7.8 |
| Kansas | 747,841 | 154,764 | 421,773 | 169,304 | 21.0 | 56.4 | 22.6 | 11.3 | 12.4 | 11.1 | 3.7 | 3.7 | 3.5 |
| Nebraska | 2,861 | ..... | 2,861 | ..... | .. | 100.0 | ... | 9.9 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Illinois | 548,678 | 54,221 | 448,492 | 45,965 | 9.9 | 81.7 | 8.4 | 3.7 | 6.7 | 12.3 | 2.7 | 3.1 | 1.5 |
| Indiana | 30,952 | ..... | 12,008 | 18,944 | ... | 38.8 | 61.2 | 6.2 | 14.6 | 12.7 | 0.2 | 0.1 | 0.1 |
| Kentucky | 50,884 | ..... | ..... | 50,884 | ... | ... | 100.0 | 9.5 | 10.0 | 10.4 | 0.3 | 0.3 | 0.3 |
| Tennessee | 404 | ..... | ..... | 404 | ... | ... | 100.0 | 8.8 | 9.0 | 10.0 | 0.0 | 0.0 | 0.0 |
| Michigan | 64,816 | 2,705 | ..... | 62,111 | 4.2 | ... | 95.8 | 3.3 | 2.5 | 3.2 | 0.3 | 0.3 | 0.3 |
| Ohio | 37,219 | ..... | ..... | 37,219 | ... | ... | 100.0 | 11.9 | 12.7 | 13.2 | 0.2 | 0.2 | 0.2 |
| West Virginia | 38,035 | ..... | ..... | 38,035 | ... | ... | 100.0 | 11.1 | 11.7 | 12.1 | 0.2 | 0.2 | 0.2 |
| Pennsylvania | 231,773 | ..... | ..... | 231,773 | .. | ... | 100.0 | 12.5 | 14.4 | 15.3 | 1.1 | 1.3 | 1.5 |
| New York | 48,185 | ..... | ..... | 48,185 | ... | ... | 100.0 | 14.0 | 10.1 | 11.2 | 0.2 | 0.3 | 0.3 |
| Total | 20,099,258 | 3,376,914 | 12,787,331 | 3,935,013 | 16.8 | 63.6 | 19.6 | 15.0 | 15.7 | 15.2 | | | |
| As of Jan. 1, 1940 | 19,687,379 | 4,104,386 | 11,980,037 | 3,602,956 | 20.8 | 60.9 | 18.3 | | | | | | |

*In thousands of barrels.

nole and all of the Ordovician pools, except Big Lake. This reserve at moderate depths furnishes one of the country's most important backlogs when easily accessible production is in demand.

Next to West Texas, the upper Gulf Coast district of Texas has the greatest partially developed reserve. This area includes several new fields such as West Ranch and Lolita, and a large number of smaller pools where a few wells have proved up important reserves.

Possibly those states with an abnormally small proportion of partially developed reserves provide greater interest than those with a large amount. These states are generally those in which prospecting has not been highly successful over a period of time, although they may also include states like Illinois in which new pools are rapidly drilled up. The need for new reserves in any area may be noted where a low proportion of partially developed reserves is combined with a falling reserve in terms of years' supply. California and the East Central Texas district both have low discovery rates but both areas have such a large backlog that new large discoveries might be a burden to the industry. Oklahoma, Illinois and Michigan, on the other hand need new reserves and exploration is active in all three states. Indiana's reserves were sharply increased during 1940 by the development of the Griffin field but production rose even faster, so that this area also is being actively prospected.

### Flush and Semiflush Fields

The reserves in flush and semiflush fields as of January 1, 1941, was 12,787,331,000 bbl. or 63.6 per cent of the total. This compares with 11,980,037,000 bbl. as of January 1, 1940, or 60.9 per cent of the total at that time. The greatest reserve of flush production is in Texas, with about 60 per cent of the nation's supply. Of this, about 60 per cent is in East Texas and on the Gulf Coast. Other large reserves of flush production are in West Texas, the Corpus Christi district, the Texas Panhandle, California, Kansas, Oklahoma, Illinois and coastal Louisiana.

Inclusion of the latter states in the list may occasion some surprise. Opinion has been expressed that Oklahoma is on the decline as a producing state but there are still large recoverable reserves in such fields as Oklahoma City and St. Louis where many wells make 200 bbl. per day or more regularly.

The rapid decline of Illinois from a peak of 517,000 bbl. in July to 325,000 bbl. by the end of the year has blinded many observers to the important sands that are still producing large quantities of oil. The swift decline from the peak was largely due to failure of the limestones—both Devonian and Mississippian—to hold up. However, the Illinois fields are now producing mainly from sands which will continue to yield large quantities of oil for many years. Production in Illinois was declining at the rate of nearly 1 per cent a week around the end of last year. This decline settled to one-half of 1 per cent and is now almost completely arrested.

Various estimates have been made of the amount of additional oil that could be recovered simply by turning valves and without the drilling of any additional wells. These immediately available supplies are in the flush and semiflush pools. Of the 10 districts containing the largest reserves of this class, all but Illinois and Oklahoma could materially increase production overnight provided pipe-line or other transportation facilities were available.

### Fields on Settled Production

The settled fields have estimated reserves of 3,935,013,000 bbl. or 19.6 per cent of the country's reserves. Probably 80 per cent of the wells in the United States produce from fields of this type. Production per well is small and costs relatively high but the quantity of oil produced is important. A great part of this reserve is located close to markets in old long-established districts. California, Texas and Oklahoma have the largest reserves of this class.

These settled areas have surprisingly long lives and it is believed that the figures presented are much lower than the actual ultimate recoveries from these pools. It is possible to make accurate estimates on individual pools which will be very close to correct, provided no secondary-recovery methods are employed. However, if production statistics are considered over a period of years for areas or groups of fields, it is found that the family curve does not decline nearly as rapidly as the curves for most fields in the group. There is almost invariably enough work going on to increase production in individual fields and to slow up the decline in the area as a whole. Normally, it can be considered that this work will continue almost indefinitely so long as oil can be produced at a profit. There has not been a major field yet abandoned in the United States although many have been on production for 40 years or more.

### Years' Supply of Crude

The years' supply of crude in sight at the beginning of each calendar year is determined by dividing the estimated reserves as of that date by the total production for the preceding year. It can be modified either by a change in the rate of production, by variation in the rate of discovery, or both. It should, therefore, be considered in conjunction with the columns showing percentages of the country's total reserves. California's position has remained almost stationary for the past 3 years, with a slight increase in the amount of available reserves in the Los Angeles Basin. The Rocky Mountain states have had a considerable increase in production without a corresponding increase in discoveries and their reserve position is less favorable. With the exception of Oklahoma, the Mid-Continent and Gulf Coast area are enjoying relative stability, although Oklahoma is steadily losing ground in available supply. This loss is largely, although not entirely, balanced by reduced rates of production.

In the East, Illinois lost ground during 1940 by reason of a reduced discovery rate and increased production. Even considering present production, estimated reserves in Illinois are only about 4.6 times annual production. The difficulty faced by Michigan in maintaining its production is shown by the uniformly small ratio between reserves and production. Practically all of Michigan's production is now settled and as declines are slower in this type of field than in flush fields, production has inevitably fallen off.

### Relation of Price to Reserves

There is an empirical relationship existing between the price of crude and estimated reserves that is worthy of note. If the average price of crude is multiplied by the number of years' supply in reserve, the product is almost constant. This relationship has held within narrow limits since 1918. At that time with approximately 6 years' supply in sight crude sold at $2.50. Today, with 15 years' supply in reserve, the price is around $1. Even with the slight reduction in years' supply during the past year there has been a strengthening of the market almost equivalent to the 4½ per cent reduction in relative reserves.

Reserves in flush and semiflush fields are believed to be the governing factor in this relationship. When the working reserve is large, a great part of it is in low-cost flush production and this easily available supply tends to depress the market. Conversely a large demand combined with small reserves will draw down this flush production at too rapid a rate and will quickly reduce it into the settled class. Consequently the demand may become greater than the total that can be withdrawn and prices will rise sharply.

Discoveries in 1941 are more numerous than during the same period in 1940 but to date none of these has been of a magnitude sufficiently great to depress the market. If the empirical relationship continues to operate, a period of gradually stiffening prices is to be expected.

●

## Structural Trends on Gulf Coast Of Texas and Louisiana

*(Continued from Page 39)*

by their occurrence along a regional northwest-southeasterly anticlinal trend, rather than by high local uplifts.

Local structures, especially salt-dome structures, may, of course, have been formed at any place and without any connection to the regional structural pattern, but it is logical to assume that regional structures and trends are directly or indirectly responsible for a large percentage of local structures and their general alignment.

Some of these alignments and occurrences of local structures have been mentioned previously. Of interest also is the alignment of the series of fields from Vanderbilt to O'Conner along trend *VIII* and of Eureka, Clinton, Nome and Amelia along the same trend, between Houston and Beaumont. The fields in the Pettus region apparently have some structural connection with the negative trend *XI*, which is interpreted as an anticlinal structural axis.

Further west, the positive and negative trends to the north of trend *VIII* have been interpreted as anticlinal and synclinal regional axes respectively with exception of trend *XV*, which may have a purely stratigraphic meaning, as indicated by the minimum at (3) in Fig. 1.

A series of prospects are located along trends *XII* and *XIV;* Conroe and Spurger are located along well-expressed magnetic positive trends *XVI* and *XVIII*, respectively.

### General Conclusion

The regional magnetic anomalies in the Gulf coastal area range from —200 gammas to +550 gammas and thus are of the same order as in regions farther south where the basement complex is much shallower and primarily responsible for the magnetic anomalies, as for example in West Texas.

As far as local anomalies are concerned, there exists, however, a great difference between the Gulf coastal area and areas like West Texas for example. In the latter district local structures are indicated as a rule by fair-sized magnetic anomalies, whereas the magnetic expression of large structures in the Gulf coastal district may not amount to more than 10 to 15 gammas, and anomalies as small as 3 gammas and 5 gammas have been found to indicate producing structures. In this connection the reader is referred to the writer's paper on "Some Practical Examples of Micromagnetic Prospecting," which appeared in the Gulf Coast issue of The Oil and Gas Journal on April 25, 1940.

Greatest accuracy in the field work is advisable under any geological conditions, in order to analyze the details of local structures.

# Abstracts of A. A. P. G. Papers

**Presented before the annual meeting of the American Association of Petroleum Geologists at Houston, Tex., April 2-5**

## Developments in 1940

**O. L. BRACE (Consulting Geologist, Houston, Tex.)**

**Review of Developments in 1940, Gulf Coast of Upper Texas and Louisiana**

The poor discovery record of the upper Texas Coast for 1940 is no improvement over that established for 1939. Coastal Louisiana, however, showed an advance in both the number and quality of new areas uncovered. The most noteworthy improvement of the year in Louisiana has been the increasing importance of the new reserves added to old fields through extensions and new sand discoveries.

During the past few years, a shift in the center of successful activity has given coastal Louisiana the lead over upper Texas. This shift coincided with the opening of the large area of only partly explored delta territory of Louisiana to intensive exploitation.

The increase in the number of economically marginal areas that are now being developed is credited to improvements in the technique of well testing and completion, mainly the introduction of the electric log, gun perforating and cement squeezing.

●

**URBAN B. HUGHES (Consulting Geologist, Jackson, Miss.)**

**Developments in Mississippi in 1940**

Development in Mississippi during 1940 passed through two phases. The first of these was hysterical, resulting from the fact that only a few of the major companies and independent operators had scientific data or lease protection prior to the discovery at Tinsley. This resulted in rapid, and necessarily sketchy, geophysical work, promiscuous leasing and drilling of wells by crews largely inexperienced in Gulf coastal formations. In the second phase, hasty, haphazard work gave way to sounder practices in both exploration and drilling.

During the first half of the year leasing activity was largely confined to the north portion of the state, but during the latter months the play shifted to the south. The 1,221,412 acres of leases owned by major and larger independent oil companies on January 1, 1940, was increased to 4,775,619 acres during the year. A probable additional 1,500,000 acres were acquired by individuals and small independents in the same period.

On January 1, 1940, there were 61 geophysical parties operating in Mississippi. This figure was increased to 64 on June 1, and decreased to 22 on the last day of the year. At the peak, more than 60 per cent of all geophysical parties were operating in the state.

No new discoveries of importance occurred. The Pickens field, with four producers, proved disappointing. Tinsley spread beyond early expectations and had 101 producing wells.

Of the 208 wells drilled, 103 were dry holes and of these only seven resulted in positive proof of the existence of structure. Many of the dry holes were drilled without geological guidance or were located on geophysical evidence which was unsatisfactory, and some were drilled on seemingly good prospects which were disproved in drilling.

●

**L. B. HERRING (Consulting Geologist, Corpus Christi, Tex.)**

**Developments in South Texas During 1940**

This paper discusses the developments during the year 1940 in the South Texas area and suggests that the collapse of foreign markets caused pipe-line proration and local price cuts.

Twenty-eight new producing areas were found during the year. Drilling was slightly under the 1939 rate, and geological exploratory work was greatly reduced.

Four wildcat wells were completed in Wilcox sands, three producing gas and condensate and one producing oil with water. None of these discoveries appears to represent reserves of consequence.

Condensate production reached 8,800 bbl. per day, and nine plants were operating on a repressuring or a recycling basis.

●

**TAYLOR COLE (University Lands, Midland, Tex.), ROBERT I. DICKEY (Forest Development Corp.) and EDGAR KRAUS (Atlantic Refining Co.)**

**Developments in West Texas and Southeastern New Mexico**

Developments in West Texas continued at about the same rate as during the previous 2 years, with 1,747 field wells being completed, and 119 wildcats. The percentage of wildcat strikes was unusually high in that 47 were producers while the percentage of dry holes was only 5.6 per cent. Eighteen new discoveries (twice as many as during 1939) were recorded with 14 from Permian rocks ranging from the Yates sand (upper Whitehorse) down to the upper portion of the Clear Fork. The four pre-Permian discoveries included one each from the Lower Pennsylvanian, Silurian, Simpson (Middle Ordovician), and Ellenburger (Lower Ordovician). Five of the new discoveries are in Crockett County. Many of the fields were extended considerably, and several geologically important wildcats were drilled.

*TAYLOR COLE*

The trend in exploration seems to be toward more and deeper wildcatting with probably a slow orderly development of the new discoveries except where near-expiration leases are held.

There have been very few improvements in drilling and production practices. Activity in geophysical exploration was at a high level in the central and southern portions of the Midland basin and along the eastern platform.

Development in southeastern New Mexico was less than the previous year with 542 wells being drilled. The percentage of dry holes (13.5 per cent) ran higher than previously because of hazardous development in lenticular, irregularly cemented "sands" flanking the Artesia-Maljamar nose on the south and north. Few deep exploratory tests were drilled in spite of contiguous areas of West Texas being productive from pre-Permian formations. Only two new discoveries were recorded from southeastern New Mexico, but several fields were extended considerably.

●

**C. E. DOBBIN (U. S. Geological Survey, Denver, Colo.)**

**Developments in Rocky Mountain Region in 1940**

There were no major discoveries of oil and gas in unproved areas in the Rocky Mountain district in 1940, most of the drilling being restricted to inside locations in major fields.

In Wyoming good shows of oil encountered in the Shannon sandstone member of the Steele shale (Upper Cretaceous) in the Cole Creek field during deeper drilling in 1937 were tested further in 1940 and commercial production found; one relatively small oil well was drilled in the North La Barge field, Sublette County; about 2 miles northwest of the nearest production in the La Barge field; and wells deepened a few feet in the Tensleep sandstone (Pennsylvanian) in the Mahoney field, Carbon County, and to the basal member of the Tensleep in the Lost Soldier field, Sweetwater County, were good oil wells. During 1940, commercial amounts of oil were first found in the Tensleep in the East Mahoney (West Ferris) field, Carbon County. No new producing zones were found elsewhere in the Rocky Mountain district during 1940. However, in February 1941, commercial amounts of oil were first found in the Sundance formation (Upper Jurassic) in the Wilson Creek field, Rio Blanco County, Colorado.

In Wyoming the Frannie field, Park County, was extended almost ½ mile northwestward into Carbon County, Montana; Sundance production was extended eastward and southeastward about one location in the Lance Creek field, Niobrara County; the La Barge oil field was extended westward by relatively active drilling; and Tensleep sandstone production was extended about ¼ mile northeast in the Wertz oil field, Carbon County. Gas production in the Frontier sandstone (Upper Cretaceous) was extended about ½ mile northwestward in the Muskrat field, Fremont County, and less than half a mile southeastward in the nearby Big Sand Draw field. In the Hiawatha field, Sweetwater County, commercial gas was found in the Wasatch formation (Eocene) about a mile north of the nearest producer.

In Colorado a good Morrison (Upper Jurassic) sand well was found in the Wilson Creek oil field, Rio Blanco County, ¾ mile southwest of the nearest producer; and on the east side of the Hia-

*(Continued on Page 54)*

## TYPES C, CS AND CM
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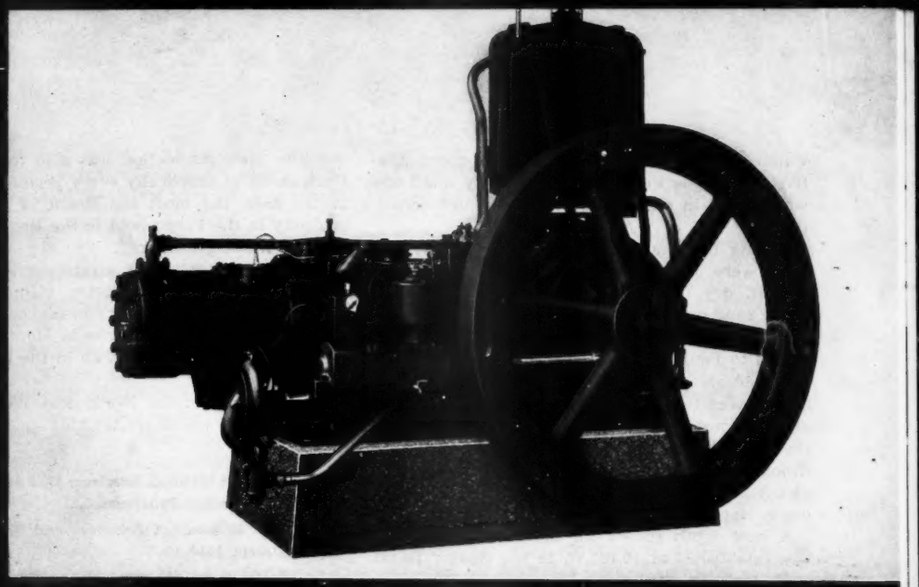

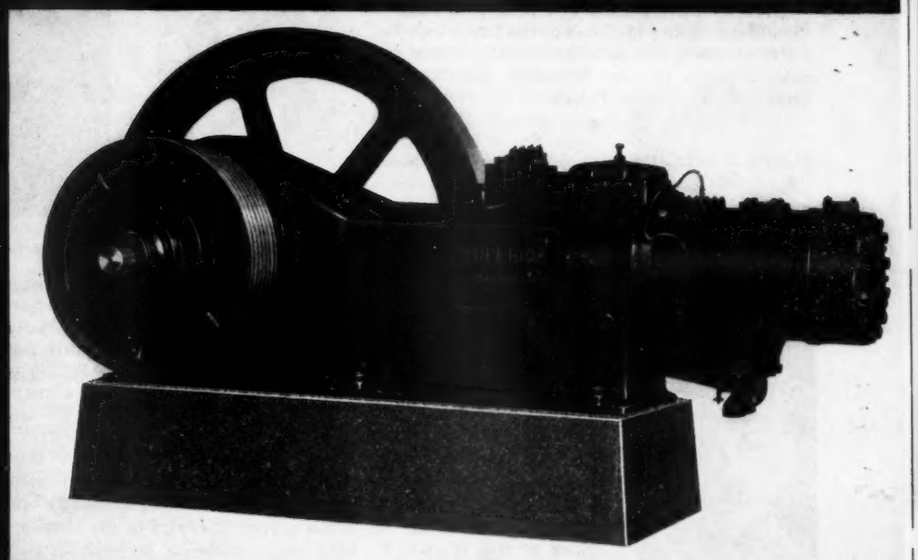

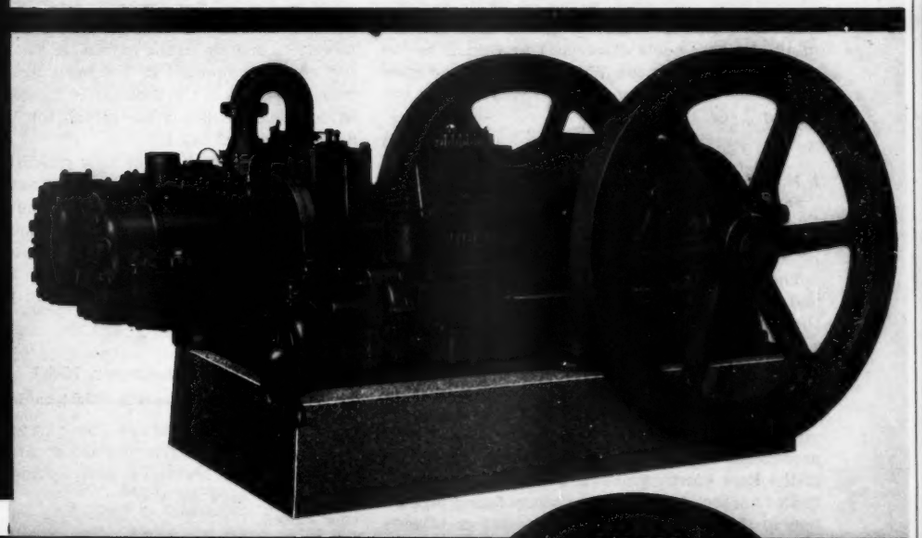

# NATIONAL SUPPLY COMPANY

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MARACAIBO, VENEZUELA

watha oil and gas field, Moffat County, one relatively large gas well and one relatively small one were found in sandstones of the Wasatch formation.

During the year, very few important wildcat wells were drilled in the district. In Montana a 7,116-ft. dry hole was drilled through the Sundance sand on the Absarokee structure, Stillwater County. In Wyoming a 6,302-ft. dry hole was drilled to Pennsylvanian beds in the middle Baxter basin area, being the first well to test certain lower zones in the Baxter basin fields; a 4,243-ft. dry hole was completed in the Deadwood formation (Cambrian) on the Bull Creek structure, Crook County; and an 8,343-ft. dry hole was completed in the Tensleep sandstone on North Geary dome, Natrona County.

A new depth record for drilling in Wyoming was established at 10,121 ft. in the Badger Basin field, Park County.

Several relatively short pipe lines were built in the district during 1940, one of the larger ones being the 100-mile line between the Billy Creek gas field, Johnson County, Wyoming, and the Big Sand Draw gas line at Casper.

●

**ALFRED H. BELL (Illinois Geological Survey, Urbana, Ill.)**

**Oil and Gas Development in the Eastern Interior Basin in 1940**

Oil production in the eastern Interior basin reached a new high in 1940, about 54 per cent above 1939. Most of this increase was due to the drilling of wells in the Devonian limestone in the Salem and Centralia pools, Illinois. Thirty new oil pools were discovered in Illinois, and several in southwestern Indiana and western Kentucky. The Indiana discoveries were within about 10 miles of the Wabash River which is the Illinois-Indiana state boundary in this area. Twelve of the 30 new pools discovered in Illinois are in counties bordering the Wabash River. Geological conditions revealed by the new drilling are discussed.

●

**J. M. CLARK (for Committee of North Texas Geological Society)**

**New Developments in North and West Central Texas 1940**

The most important development in the North and West Central Texas area during the year was the remarkable number of new producing horizons discovered. In the K.M.A. field the Ellenburger (Ordovician) was found productive in the western part; two pools on the Bend arch in Young County and one pool on the eastern edge of the Permian basin in Stonewall County found production in the Chappel lime (Mississippian); in the Fort Worth syncline, a pool in Clay County and another in Montague County found production in the lower Bend conglomerate; the Caddo (Bend) was found productive in two pools on the Bend arch in Archer County, in two pools in the Fort Worth syncline in Clay County, and in one pool in Montague County; the Strawn series (Pennsylvanian) yielded production in two pools on the Bend arch in Archer County and in one pool on the east flank of the arch in Clay County; the Canyon series yielded production in two pools on the west flank of the Bend arch in Baylor County, in one pool in Jones County, in one pool in Foard County on the Electra arch, and in one pool in Wilbarger County in the Red River syncline. New production was also found in the Cisco series in practically every producing county in the area, the most significant of which was probably in the Fargo pool in the Red River syncline in Wilbarger County.

Probably the only new stratigraphic discovery in the area was the tentative identification of Viola limestone (Ordovician) in two of the deeper wells in Clay County and two in Montague County and one in Wise County, all in the Fort Worth syncline.

Total production for North and West Central Texas for 1940 was 49,221,213 bbl.

●

**JOSEPH PURZER (Phillips Petroleum Co.) and WARREN B. WEEKS (Phillips Petroleum Co.)**

**Development in Southern Arkansas and Northern Louisiana During 1940**

*JOSEPH PURZER*

*WARREN B. WEEKS*

Annual oil production for this area during 1940 increased by 3,563,675 bbl., or 7.6 per cent over the figure of the previous year. South Arkansas produced 25,790,380 bbl. and North Louisiana 24,381,760 bbl., for a total of 50,172,140 bbl.

Of the 169 wells drilled in southern Arkansas, 38 were dry; while 131 of the 651 North Louisiana wells were dry. The majority of the wells drilled in South Arkansas were drilled to the Smackover formation, with the Hosston ("Travis Peak") formation a close second. In northern Louisiana a great majority of the wells ended in the Gulf series, while the majority of the remaining wells ended in the Eocene series. The preponderance of Gulf wells in North Louisiana is due largely to drilling in the old Caddo field. Prospecting and development in southern Arkansas continued to point to the Smackover formation, while in northern Louisiana the search for Wilcox production predominated.

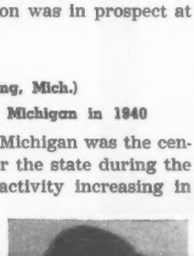
South Arkansas had one new gas-distillate field from the Smackover limestone, a new oil field from the Paluxy formation, and one producing from the Hosston formation. North Louisiana had two new oil fields and two new gas fields in the Wilcox formation, and one gas field in the Paluxy. A new field from the Hosston was in prospect at the end of the year.

●

**R. P. GRANT (Geologist, Lansing, Mich.)**

**Oil and Gas Developments in Michigan in 1940**

The southwestern part of Michigan was the center of oil and gas activity for the state during the greater part of 1940 with activity increasing in the "basin" area as the year closed.



The discovery and partial development of two new shallow "stray" sand (Mississippian) gas areas and important extensions elsewhere have increased materially the gas reserves of the state. Gas production during 1940 was approximately 40 per cent greater than in the previous year.

Despite numerous oil discoveries and extensions to proved areas, the additions to known oil reserves were of no great consequence. Oil production for 1940 was actually 16 per cent less than in 1939 but a general strengthening in price partly offset this decline.

Several geophysical parties were reported operating in the southern peninsula but core testing seemed to be the favored exploratory method.

The search for new deep producing zones has received some encouragement. In the "basin" substantial gas showings were encountered in the basal Salina (Silurian). In southwestern Michigan showings of oil were reported at the approximate horizon of the St. Peter sandstone.

●

**J. R. LOCKETT (President, Appalachian Geological Society and Committee)**

**Developments in the Appalachian Area During 1940**

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**F. R. DENTON and R. M. TROWBRIDGE (Consulting Geologists, Tyler, Tex.)**

**Developments in East Texas During 1940**

Three oil fields were discovered and oil production found in a gas field in East Texas during 1940.

The Hawkins field of Wood County which is producing from the Woodbine is a discovery of major importance and has set in motion a large-scale leasing and geophysical program.

Routine development of proved oil fields kept completions at approximately the 1939 level. Relatively few exploratory tests were drilled.

●

**EDWARD A. KOESTER (Darby Petroleum Corp.)**

**Developments in North Mid-Continent in 1940**

Kansas experienced a year of increased activity both in development and wildcatting, but results in the latter were relatively less fruitful. The number of total completions increased 33.9 per cent over 1939 and the dry-hole percentage dropped from 24.7 per cent to 20.3 per cent. Initial oil production per well fell slightly from 1,577 bbl. to 1,561 bbl., but the completion of 1,421 oil wells developed about 2,200,000 bbl. of new potential compared to 1,500,000 bbl. of new potential in 1939. Despite less activity in the Forest City basin, wildcatting increased from 95 completions in 1939 to 145 in 1940, but no important pools have yet been developed among the 23 discoveries. The most promising, as well as the most important of these pools, is the Ray pool in Phillips County, which previously had had but one small pool. In the Forest City basin, an oil and gas discovery of doubtful value was made in the McLouth pool of Jefferson County. The Bemis-Shutts, Burnett, Bornholdt, Trapp, Hall-Gurney, and Zenith pools accounted for 42 per cent of the new wells and 61 per cent of the new potential. Numerous extensions to old pools were made and many pools were joined.

In Nebraska the Falls City pool of Richardson County was the scene of the completion of 25 oil wells and 7 dry holes. This pool produces low-gravity oil from a dolomite in the upper portion of the Devonian that is generally referred to as "Hunton." The wells respond favorably to acid treatment but water encroachment is rapid and it is doubtful that "Hunton" production in this pool will ever be of much importance. Thirty wildcat dry holes and one small oil well were completed elsewhere in Nebraska in 1940.

The Forest City basin play in Missouri resulted in the completion of seven additional deep failures and northeastern Missouri drew seven dry holes. There was also some moderately successful shallow-gas development in the area east of Kan-

sas City. There was a little intermittent drilling in Iowa, and some in the Dakotas, but the latter states were the scene of much checkerboard leasing and exploratory work.

●

## Papers of General Interest

**EUGENE H. VALLAT (Continental Oil Co.)**

**Exploration Work in California During 1940**

The discovery rate for the year 1940 in California declined. This followed and was accompanied by a decrease in geophysical work and exploratory drilling while geological employment remained approximately the same. Only one new oil field was discovered and there were a few areal and depth extensions of known fields. Several wildcat wells were completed as small producers in what, at present, appear to be noncommercial accumulations.

Drilling within fields increased California's potential production but additions to reserves has lagged behind withdrawals and lowering of estimates in fields under development. Faster drilling has accelerated the approach to a drilled-up status for California fields. An attempt is made to arrive at the cost and length of payout time for an average top allowable well as an indication of the optimum expectancy for operating capital put into development wells.

●

**EDGAR W. OWEN (Secretary-Treasurer, A.A.P.G., with A. L. Wentz, San Antonio, Tex.)**

**The Role of Surface Geology in Petroleum Exploration**

Although the use of surface geology as an independent method in petroleum exploration has become practically obsolete, it should be employed to a much greater extent in conjunction with geophysical, subsurface, and other modern techniques. Where familiar methods of mapping surface structure are not applicable, much valuable information can be obtained at low cost by physiographic studies. The application of surface, structural, and physiographic work to exploration problems in the Gulf Coastal Plain and in the Permian basin is discussed. Certain types of physiographic anomalies of diagnostic value are described, and some of the difficulties surrounding their interpretation are indicated.

●

**H. D. WILDE (Humble Oil & Refining Co.)**

**Why Crudes Differ in Value**

Although crudes are all fundamentally made up of mixtures of hydrocarbons and are hence similar in this respect, the type of hydrocarbons and the relative proportions in which they are present can vary widely from crude to crude. This variation causes crudes to differ in value. The value is established by the refiners who use crudes as a raw material for the manufacture of the various finished products. Some crudes are in demand and are assigned a high value because substantial yields of good-quality products can be made from them with little special processing, whereas, others are penalized because certain products are not present or of such poor quality that special processing (which is usually expensive) is necessary to make these products saleable. In order to evaluate crude, a sample is assayed in the laboratory, whereby the yield and quality of the primary products are determined and these data are used in computing the value of the crude.

Other factors, such as transportation costs to refinery centers and the ultimate consumers and competitive conditions, are also considered in arriving at the price paid for a crude at the well.

●

**L. M. STORM (Schlumberger Well Surveying Corp.)**

**Resume on Sedimentation in the Gulf Coast Region of Texas and Louisiana**

The structure, composition, and manner of accumulation of present-day deposits along the coast are described along with those of Recent and Pleistocene time still largely intact. Meaning of the topography on surface of these deposits, and their relation to glacial history are discussed.

Following this and using it as a background, the more significant features of formations back to the beginning of the Eocene are reviewed.

Topics receiving special attention are:

Delta structure of several kinds and the concept of a Deltaic Coastal Plain; subsidence under load and the Gulf Coast geosyncline; changes of Gulf Coast sediments in the direction of the dip along the strike; and structural changes contemporaneous with deposition of sediments.

The manner in which the facts and theories discussed may be used by geologists in the search for oil.

●

**BASIL B. ZAVOICO (Chase National Bank, New York)**

**Foreign Developments During 1939 and 1940**

The oil industry has inevitably been affected by the present great war, since it supplies the prime movers for striking power in the conflict. A unique feature of the business is that unlike other war supplying industries its rapid growth usually precedes major conflicts; and exploration and construction stagnate while they last. Time necessary for exploration and development of new resources and for construction of large new refining plants—together with heavy demand for metals at the time when these products are vitally needed elsewhere—all tend to slow down active development of new crude-oil reserves during actual hostilities. In the present war and immediately preceding it the increased range of bombing planes, as well as the political uncertainties in large portions of the world, further served to reduce new work in the oil industry to a minimum except in the Western Hemisphere. However, even here in portions of South and Central America the social and political changes under way brought exploration for new reserves to a virtual standstill. Geologists and geophysicists were unavoidably affected in the foreign fields, resulting in a sharp increase in the domestic supplies in these two professional classifications.

A revolutionary effect of the war is the growing volume of synthetic hydrocarbons reaching the markets under the vital necessities of the Axis powers and to a lesser degree of Soviet Russia. Improved processes and quantity production will result in lowering costs and some synthetic hydrocarbons may prove to be competitive with corresponding crude-oil derivatives within a rather narrow span of years, particularly in cases where long distances separate sources of supply from markets. The indicated developments may have a very considerable economic effect on the various phases of the oil industry.

Among principal producing countries of the world, outside of the United States, none increased its production except Colombia where completion of a new pipe line allowed somewhat larger exports, production of this country increasing from 23,774,151 bbl. in 1939 to 25,526,492 bbl. during 1940, with the result that in 1940 production of the world, outside of the United States, declined to about 790,000,000 bbl. (2,158,469 bbl. per day) from 810,000,000 bbl. (2,219,178 bbl. per day) produced in the preceding year. More particularly dormant was the exploration work without any new really major regional or local discoveries. Such trend is likely to continue for the duration of the war and only the end of the conflict should bring the renaissance in all exploratory activities with a subsequent rapid expansion in the demand for qualified technicians.

●

**P. E. FITZGERALD (Dowell, Inc.), J. R. JAMES (Dow Chemical Co.) and RAY L. AUSTIN (Dowell, Inc.)**

**Laboratory and Field Observations of the Effect of Acidizing Oil Reservoirs Composed of Sand**

The widespread use of chemicals on oil and gas reservoirs composed of limestones has attracted the attention of engineers and geologists to the many wells producing from sands. The early attempts to treat wells producing from sands were not uniformly successful. During the past several years the authors have been collecting cores from various producing horizons; most of them have been studied in the laboratory. In certain areas chemicals have been used on sands with good results. This paper discusses the results of the laboratory work and contains a compilation of well-treating data. Of the more than 300 cores studied, over 80 per cent showed an increase in permeability when acidized in the laboratory. The average permeability increase was over 500 per cent. The average acid solubilities of the more than 80 different oil-producing sands was 8.5 per cent.

*P. E. FITZGERALD*

The authors have also included data on compressive strength of the cores before and after acidizing and chemical and X-ray analyses of typical sands.

●

**WILLIAM L. RUSSELL (Well Surveys, Inc.)**

**Applications of Radioactivity Logging**

Radioactivity logging is the only known method of making accurate lithologic records through casing and cement. At present, radioactivity logs are used chiefly to determine exactly where to perforate the casing and cement, and the process has been highly successful in this use. Other applications consist in determining sample lag, making correlations and cross-sections, locating faults, mapping subsurface structure for deeper drilling, logging beds too thin for electric logs to record, making detailed lithologic records of oil sands for use in connection with the recovery of oil by water flooding, and surveying potash deposits in cased wells. Well Surveys, Inc., has also developed a method for determining the radioactivity of cores and samples which has proved its value in interpreting the logs and in solving problems of sedimentation.

●

**J. C. BARCKLOW (Lane-Wells Co.)**

**Radioactivity Well Logs, Their Use and Application in the Fields of Petroleum Geology, Economic Geology, and Petroleum Engineering**

Much experimental work has been done in the past on radioactivity as applied to making well logs. Quite recently, about June 1940, such logs were offered to the industry on a commercial

basis. Since that time great strides have been made in the technique of producing these logs. With the advent of logs of this sort many uses and applications for them have suggested themselves. They no doubt will occupy a prominent place in the petroleum industry as the members of that industry become better acquainted with them.

●

## Regional Papers

**TOM McGLOTHLIN (Gulf Oil Corp.)**

**Notes on the Geology of Mississippi**

The larger structural features of Mississippi include: the Issaquena-Sharkey "platform," an eastern extension of the Monroe-Richland uplift, the salt basin, the Jackson structure, and the George and Stone County "high."

Sediments that outcrop in Mississippi or that have been reached by drilling wells range in age from Ordovician to Recent. The general stratigraphy of the post-Paleozoic beds is herein discussed.

The extensive truncation of the Comanche series with the overlap of the Gulf series is not as noticeable in Mississippi as it is in South Arkansas and Louisiana. Apparently the beds of the Upper and Lower Cretaceous are more nearly parallel in Mississippi.

●

**C. B. ROACH (Shell Oil Co., Inc.)**

**A Subsurface Study of the Jennings Dome, Acadia Parish, Louisiana**

A study of the subsurface structure of the flank sediments of the Jennings dome has revealed several stages of uplift of the salt plug which have resulted in erosion and subsequent unconformities. One such uplift at the end of Marginulina times is of great importance, as it closed a period of intense faulting which does not extend into the overlying sediments. It is therefore extremely difficult, if not impossible, to predict the structural conditions which will be encountered in the Marginulina oil-sand series when drilling. Faulting of fairly recent age is also present, which cuts both the Miocene and Oligocene sections.

The origin of the mineralized Miocene sand section on the east half of the dome is also discussed, together with the effect of these hard cemented sands upon the growth of the salt plug. This further indicates the manner in which the oil migrated to the supercap sands.

●

**S. RUSSEL CASEY (Woodley Petroleum Co.) and RALPH B. CANTRELL (Lane-Wells Corp.)**

**The Davis Sand Lens, Hardin Field, Liberty County, Texas**

The Davis sand lens of the Hardin field is a buried offshore barrier (bar). It is in the upper Saline Bayou member of the Yegua (upper Eocene) formation.

An isopach map of the interval containing the Davis lens shows a marked thickening within the area where the best development of the Davis sand is found. It discloses that the bar along its long axis is approximately 9,400 ft. in length, and the width varies from approximately 300 ft. to 1,200 ft. The total area covered by the lens is approximately 250 acres. The contours of the isopach map are lines of sedimentation from which the section to be penetrated may be postulated in advance of the drill.

The Davis "zone," wherein the lens is found, is composed of alternating sand, sandy shale and shale, and is arenaceous in character indicating lagoonal or tidal flat deposition. The main sand is a medium-grained quartz sand, containing few other minerals, as compared to the finer grained, more mineralized sands of the Yegua formation.

The lens was laid down as a barrier beach or offshore bar by a retreating Yegua sea.

●

**CARL B. RICHARDSON (Barnsdall Oil Co.)**

**A Comparative Study of the Origin and Distribution of the Gulf Coast Tertiary Sediments**

The bottom sample descriptions from Coast and Geodetic Survey charts have been compiled on a map of the Gulf of Mexico. The shape of the gulf bottom based upon soundings has been studied with respect to the action of currents and waves upon distribution of sediments. The following zones of deposition are outlined and discussed: continental, lagoonal, the sand zone, the mud zone, the coral zone, and the deep-sea muds.

Four cross-sections, exaggerated 20 times vertically, have been drawn from the Cretaceous outcrop across the gulf. The profiles of the gulf which accompany the subsurface section relate the present sedimentary zones to those of the past. The detail of the subsurface sections shows a comparison of the various sand groups as to distribution, volume, extent, and probable effects of deltas, currents, and waves. Compared to one another, the sections show the type and relative amount of deposition on different parts of the Gulf Coast and place the time and location of the outstanding depositional events.

●

**MICHEL T. HALBOUTY (Consulting Geologist, Houston, Tex.)**

**Oil and Gas Stratigraphic Reservoirs in the University Oil Field, East Baton Rouge Parish, Louisiana**

The University field, East Baton Rouge Parish, Louisiana, is a deep-seated domal-type structure with minor faulting.

Production from the field is obtained from Miocene sands. The main and most important oil-producing horizon is the 6,400-ft. sand. Other producing sands are the 4,300-ft. gas sand, the 6,700-ft. oil sand, and the 7,100-ft. gas sand. Aside from these four producing horizons, there are three sands which are potentially productive, the 4,100-ft. and 6,200-ft. sands in which oil has been cored, and the 6,900-ft. sand carrying gas. To date, no attempt has been made to produce from these latter sands.

This field is of particular interest because of the presence of a greater number of stratigraphic traps than are known in any other field of the Gulf Coast except in piercement-type domes.

Accumulation in the productive 4,300-ft. sand, and in the 4,100-ft. and 6,200-ft. potentially productive sands is controlled by stratigraphic factors which created traps.

Individual contour maps on these three sands delineate their respective lines of pinchout and with the assistance of cross-sections of the sands in the field, provide an accurate picture of the stratigraphic traps which they form. A hypothesized explanation based on the assumption of erratic contemporaneous deposition of sediments from different sources in the same area is given.

●

**DOROTHY A. JUNG (Republic Production Co.) and DORIS S. MALKIN (Speed Oil Co.)**

**Marine Sedimentation and Oil Accumulation on the Gulf Coast**

The marine sands of the Gulf Coast are prolific petroleum reservoirs. Deposition of these sands has taken place during a series of advances and retreats of the sea. A resume of the sedimentation and depositional conditions occurring in a marine advance, or transgression, and in a marine retreat, or regression, is presented. The resulting stratigraphic sequences, the "marine overlap" and "marine offlap" are discussed under ideal conditions, and illustrated by electrical-log profiles. Particular reference is made to possibilities for petroleum accumulation as influenced by stratigraphic conditions.

Sands deposited in a transgressive sea, such as the "Cockfield," upper Wilcox (Sabinetown), Marginulina-upper Frio, and lower Miocene sands, are believed to present conditions favorable for the migration, accumulation, and recovery of oil. Although sands deposited in a regressive sea, such as parts of the Rockdale (Wilcox), lower Yegua, Vicksburg-lower Frio, and Catahoula, are not considered theoretically as favorable, local structural or environmental conditions may effect excellent reservoirs.

The compound features representing a marine invasion followed by a retreat, or the reverse, are also considered and electrical log profiles presented. The economic significance in petroleum geology of the resultant sand wedges and shale wedges is discussed. It is suggested that both local and regional studies of producing horizons be made in the light of the theory of the "marine overlap."

●

**CLARENCE E. BREHM (Consulting Geologist, Mount Vernon, Ill.)**

**The Pickens Pool, Yazoo County, Mississippi**

The Pickens pool was discovered by continuous profiling seismic work which showed an increase of closure with depth. This increase, causing four times as much reversal on the Eutaw as on the Midway, has been substantiated by drilling.

The "pool" consists of four wells producing from 4 to 8 ft. of saturated Wilburn sand in the Eutaw over approximately 160 acres. The producing area is practically defined by dry holes. Wells come in for 400 bbl., settle to a steady 200 bbl. on pump. Production to date is 300,000 bbl.

The limited producing area suggests a small structure but an isopach of the Wilcox formation shows it to be in the center of an area of structural thinning extending 30 or 40 miles parallel to the Yazoo basin.

The break in seismic reflections near the field is interpreted as a fault extending into the Lower Cretaceous. It is suggested that the original reservoir was in those lower beds and that some oil migrated up the fault plane to impregnate this small area of the Wilburn sand. This condition is compared with the faulted Tinsley field and Upper Cretaceous fields of northern Louisiana and southern Arkansas.

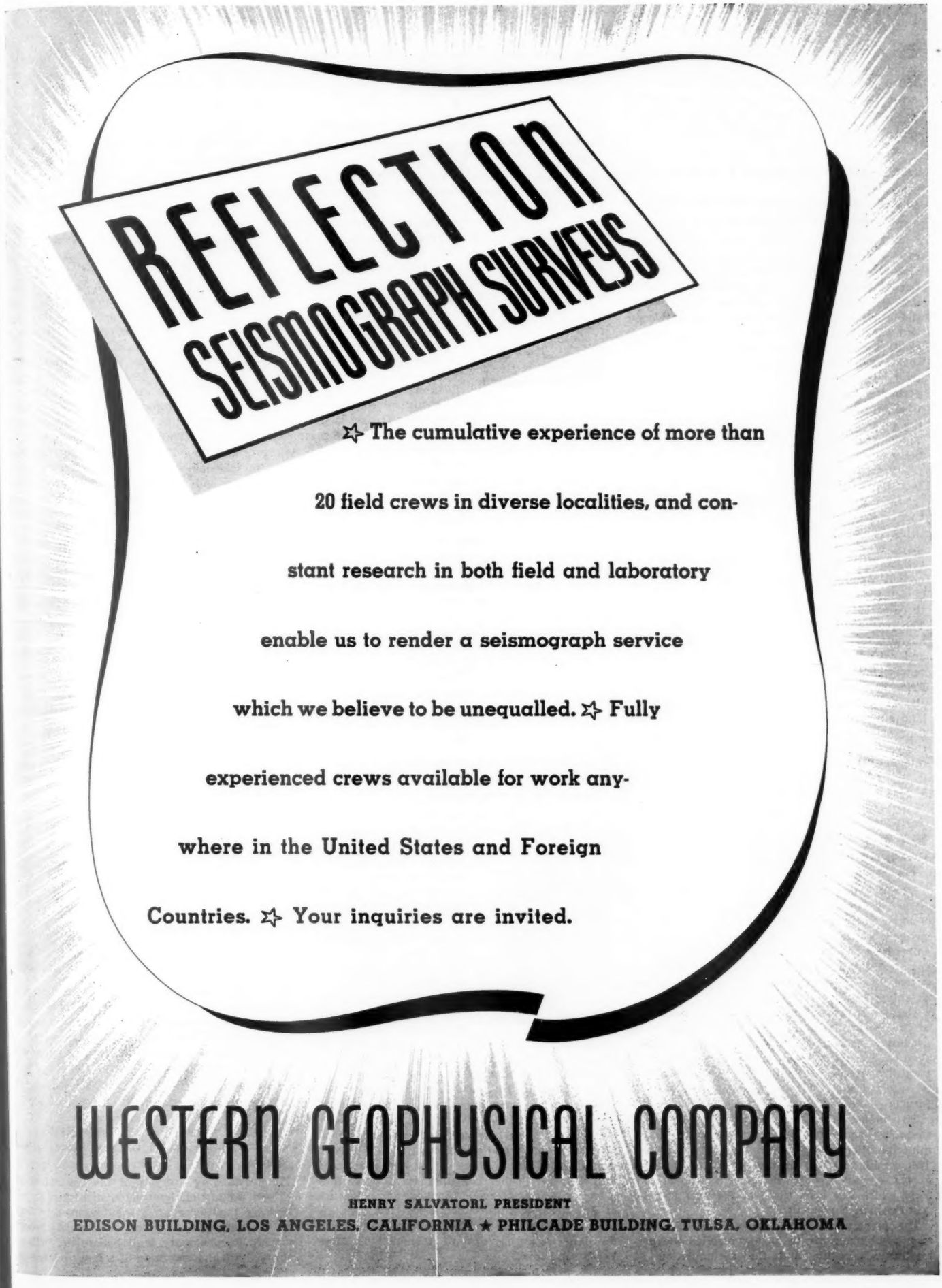
●

**JOSEPH M. WILSON (Independent Geologist, Dallas, Tex.)**

**The South Cotton Lake Field, Liberty County, Texas**

Torsion-balance work in 1934 indicated a large minimum which centered, after regional corrections were applied, slightly north of the present producing area. After two wells were drilled in the vicinity, both of which were abandoned after encouraging showings, the area was detailed with the reflection seismograph, using the continuous-profile method. As the result of this work, the discovery well was located and subsequent development of the field showed that the seismograph gave a remarkably accurate picture of the structure, a faulted dome elongated east and west.

The three producing sands are the Marginulina sand with an average of 7½ ft. of effective sand, the No. 1 Frio with 10 ft. and the No. 2 Frio with 5 ft. Each sand has a separate water level and oil-gas contact and all occur within an interval of about 100 ft. The average total depth of wells is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☆ The cumulative experience of more than 20 field crews in diverse localities, and constant research in both field and laboratory enable us to render a seismograph service which we believe to be unequalled. ☆ Fully experienced crews available for work anywhere in the United States and Foreign Countries. ☆ Your inquiries are invited.
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6,500 ft. The maximum producing area is expected to be about 1,200 acres. One deep test in the field failed to find any promising deeper sands. There are now 51 oil wells and 2 gas wells here and development is nearly complete. As of January 1, 1941, the field had produced 1,573,400 bbl.

●

**PHIL F. MARTYN and CHARLES H. SAMPLE (Houston Oil Co.)**

**Oligocene Stratigraphy of the East White Point Field, San Patricio County, Texas**

Within the scope of this paper, the strata encountered in the drilling of the majority of the wells below a depth of 4,000 ft. in the subsurface have been grouped in the Oligocene formation and the authors have restricted their study to the beds included in the interval below that depth and above the 5,600-ft. (principal oil-producing) sand. Isopach and other geologic studies of the several sand and shale zones have presented some very interesting problems. The intermittent and periodic structural-making movements, and likewise the periods of quiescence, are reflected in the sedimentary intervals of the respective strata. The most outstanding feature of the stratigraphy, however, is the well-developed erosional topography on the top of the 5,400-ft. (Zone E) sand. Isopach maps of this stratum display the typical features of degradation and planation common to the erosion cycle of normal rivers in an area being subjected to cyclic rejuvenation. Similar maps of the overlying 5,300-ft. (Zone D) shale reflect the effects of the deposition over the eroded topography. As suggested by the reconstructed terraces, and slopes attendant thereto, three periods of uplift and erosion are propounded. The erosional unconformity thus established, and advocated by the authors, offers additional criteria and evidence for the following: First, offlap or regression of the Gulf of Mexico at the close of Frio time, with the consequent development of stream drainage and erosional topography on the land surface; second, the location of an ancient Gulf of Mexico at some distance removed from the present location of the East White Point field following the deposition of the 5,400-ft. sand; and third, the delineation of the top of the Frio formation at the erosional break in the stratigraphy.

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**W. T. SCHNEIDER (Honolulu Oil Corp.)**

**Geology of the Wasson Field, Gaines and Yoakum Counties, Texas**

The Wasson field is near the central part of the Staked Plains or "Llano Estacado," in southern Yoakum and northwestern Gaines counties. At present it occupies a triangular-shaped area 15 miles long and 14 miles wide containing approximately 59,000 acres or 93 sq. miles. It is still in an active state of development and has been defined at only a few points by dry holes.

Geologically, the field lies on the extended axis of the Central basin platform, but appears to be separated from it by a trough in northern Gaines County. For the purpose of this paper the structural-stratigraphic feature under discussion will be referred to as part of the North basin platform.

Two major axes, one trending north 60° west, the other north 30° east, combine with several minor parallel axes to form a compound structure. The combined effect of the structural elements gives the whole the appearance of a terraced platform which has been tilted to the northeast by post-Permian movement.

The combination of Permian structure and stratigraphy appears to have controlled the permeability, porosity, and the accumulation of fluids. Later folding modified the position of these fluids somewhat. For the field as a whole there is no direct relationship between the present structural elevation and the ability to produce oil.

●

**W. M. OSBORN (Consulting Geologist, Midland, Tex.)**

**The Stratigraphic Trap of the Slaughter Field of West Texas**

The Slaughter field of Cochran, Hockley, and Terry counties, Texas, covers approximately 70 sq. miles and on February 1, 1941, it contained 162 producing oil wells.

Present control shows no structural closure. The field is situated on a series of noses dipping gently south-southeast but these do not control production.

The pay section, which is about 100 ft. thick, is the Permian San Andres dolomite. The pay is a brown granular dolomite having intercrystalline porosity. In some parts of the pay section larger openings also occur. The depth to the top of the pay, which is about 800 ft. below the top of the San Andres, ranges from approximately 4,900 to 5,000 ft. The southern and eastern limits of the field are mainly determined by the structural position of this pay with reference to the water table.

Production to the west seems to be limited by contamination of the pay section with silt and anhydrite. Two structurally high dry holes on this side of the field showed large amounts of silt and anhydrite in the bends equivalent to the pay section.

The northern limits of production have not been defined but indications point to a breaking down of the section in this direction also.

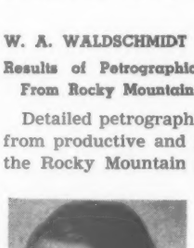
Some 275 ft. of Ellenburger is absent from the base against the Apco Ridge (Pecos County) probably due to overlap, and about 900 ft. has been eroded from the top of the section in this area.

●

**W. A. WALDSCHMIDT (Colorado School of Mines)**

**Results of Petrographic Studies of Sandstone Cores From Rocky Mountain Structures**

Detailed petrographic studies of sandstone cores from productive and nonproductive structures in the Rocky Mountain region were made to determine not only the physical characteristics of the sandstones but also the nature and distribution of the cementing materials. The sandstones have been divided into two general groups on the basis of the cementing or binding materials: First, those in which the grains are bound together by clay products; and second, those in which crystalline minerals form the cementing material. In the first group effects of compaction were noted. In the second group, sequence of deposition of cementing minerals was observed. The deposition of quartz, dolomite, and anhydrite in the order given is common in some sandstones. In others, quartz and calcite are the only cementing minerals, and of these calcite is the last mineral deposited. Other combinations of these four minerals were observed. Furthermore, sequence of deposition of the same minerals has been established tentatively for the geologic section from the Bell sandstone upward through the Mesa Verde sandstone.



Also presented are some probable effects of crystalline cementing materials upon migration and accumulation of oil and gas, upon acid treatment of wells, and upon pressures existing in oil and gas fields.

●

**W. J. HILSEWECK (Gulf Oil Corp.)**

**The Walnut Bend Pool of Cooke County, Texas**

The Walnut Bend pool is the first major deep discovery in the Marietta-Sherman syncline, a northwest-southeast trending feature which extends from southwestern Carter County, Oklahoma, to southeastern Grayson County, Texas, parallel to the Criner Hills axis and the Muenster arch. In this pool 1,000 ft. of Comanchean rocks overlie the 4,200 ft. of upper and middle Pennsylvanian (Canyon and Strawn) sediments, and beds of lower Simpson (Oil Creek) age underlie the Pennsylvanian rocks. Pre-Pennsylvanian rocks show the Walnut Bend structure as an elongate anticline. This structure was formed on an arch folded in early Pennsylvanian (pre-Bostwick) time and the Marietta-Sherman syncline was formed in late Deese time by the down-warping of the middle part of this arch. Over 1½ million barrels of oil have been produced from six sandstone zones between the depths of 4,100 and 5,100 ft., and from two dolomite beds in the Simpson group. Occurrence of oil in the sandstone zones at 4,900 and 5,100 ft., is controlled by anticlinal structure over the closely folded Ordovician beds. Electrical log cross-sections are presented to indicate that oil in the 4,100, 4,600 and 4,700-ft. zones occurs in a stratigraphic trap formed by gradation of sandstone into shale.

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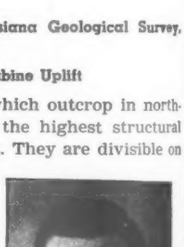
**GROVER MURRAY, JR. (Louisiana Geological Survey, University, La.)**

**Midway Stratigraphy of the Sabine Uplift**

The Midway sediments which outcrop in northwestern Louisiana outline the highest structural portion of the Sabine uplift. They are divisible on the surface into three formations, Naborton (oldest), the Logansport, and the Hall Summit (youngest). Each formation is a lithologic unit which consists of a basal sand member, a middle lignitic-shale member, and an upper calcareous member. The surface lithologic units can be traced locally into the subsurface by use of driller's logs and electrical logs. The practicability of employing these units for mapping is shown by the fact that detailed mapping of formations delimits the various oil fields of this area and shows the highest structural portion of the Sabine uplift to be in the De Soto-Red River field.



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**E. T. HECK (West Virginia Geological Survey)**

**Gay-Spencer-Richardson Oil and Gas Trend in West Virginia**

An outstanding example of the control of oil and gas production by sand distribution is provided by the Berea sand trend extending from Gay in Jackson County, northeastward through Spencer, Roane County, and Richardson, Calhoun County. With the exception of a few undeveloped

*(Continued on Page 66)*

# Abstracts of S. E. G. Papers

**Presented before the annual meeting of the Society of Exploration Geophysicists at Houston, Tex., April 1-5**

**J. J. JAKOSKY (University of Kansas).**

**Trends in Petroleum Exploration.**

Analysis of present methods of geological exploration indicates that these methods, except coring and slim-hole drilling, have reached their peak. Similar analysis of geophysical techniques shows that magnetic, seismic and gravitational methods have passed their peak of activity and have approached their optimum stage of development. Discussion of geochemical and geoelectrical methods point out their possibilities and show their possible application to stratigraphic exploration.

Deeper drilling trends and increased exploration costs show that the economic limit of structural exploration is being approached. Severe decline of fields discovered during the past few years indicates need for concern about the supply of oil within the next 5 years unless future development of geophysical methods will allow location of stratigraphic traps.

Discussion is given concerning the trends of present and future development.

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**ESME EUGENE ROSAIRE (Subterrex)**

**Prospecting Effectiveness**

The overall prospecting effectiveness or power of any given method is made up of four component parts. Three of these tend to increase with use and the passage of time. These are: (*a*) The operating effectiveness, which, referring to getting the data, is based on the cost of field operations in time and money; (*b*) the technical effectiveness, which, referring to the quality of the data, is measured by the magnitude of the observational errors; and (*c*) the resolving effectiveness, which, referring to the interpretation of the data, is measured by the ability to translate the data into terms of economic significance. The fourth component tends to decrease with successful use and the passage of time, and is, (*d*), the finding effectiveness, which is determined by the ratio of the magnitudes of findable anomalies to the magnitudes of the current observational errors. At any given time, the overall prospecting effectiveness of a given method is determined by that particular component which displays the minimum effectiveness.

In the major petroleum-producing provinces of the United States, negligible or decreasing structural-finding effectiveness is displayed by all of the successfully used structural-prospecting methods with one exception, the drill, the overall structural-prospecting power of which is limited by a low operating effectiveness. However, these methods with existing low structural-finding powers, surface geology, gravity methods, and seismic methods, display a more than appreciable finding effectiveness for anomalies which cannot be readily interpreted in terms of structure. This situation indicates that the existing low overall prospecting effectiveness of these various methods is determined not so much by a low absolute finding effectiveness as by a resolving effectiveness which is low because of structural inhibitions upon interpretation.

The sedimentary hydrocarbon prospecting method was introduced upon a theoretical basis which involved the depth of the source and the postulate of local lateral homogeneity, but did not attain any measure of overall prospecting effectiveness until its interpretation technique was relieved of such purely theoretical inhibitions. Subsequent development has shown that similar limitations upon refraction interpretation were responsible for the collapse of that method in 1930 after the method had displayed marked prospecting effectiveness for shallow high-relief structure. Attention is called to the possibility that the removal of similar inhibitions also may result in a similar increase in resolving effectiveness for other methods which today display a low structural-finding effectiveness, and thus lead to their renaissance because of their thereby increased overall prospecting effectiveness.

●

**ESME EUGENE ROSAIRE (Subterrex)**

**An Analysis of the Refraction Collapse of 1930.**

From 1924 to 1930, the refraction seismograph dominated prospecting in the Gulf Coast. During that period, the method is credited with some 48 successes, and is charged with 29 failures. The effectiveness of the method collapsed in 1930 when out of 22 tests 17 were written off as failures. With the passage of time and independent development, more than 50 per cent of these refraction failures now are found to flank subsequently developed or extended production. The interpretation of these refraction data had been based upon the assumption of local lateral homogeneity in the sediments, from which came the postulate that the seismic horizons paralleled the lithologic horizons. However, the structural information now available in the case of these independently retrieved refraction failures indicates that this postulate often if not generally fails to hold over the edges of petroleum accumulation. In such cases the seismic horizons are elevated locally, no longer paralleling the lithologic horizons to which otherwise they are approximately equivalent, giving rise to conditions where seismic-velocity "highs" flank low-relief structural "highs."

It is now obvious that refraction anomalies resulted from two effects, one purely structural and the other not associated with structural deformation. In the case of high-relief structure at relatively shallow depths, the structural effect predominated, so that the refraction successes are almost wholly of this type. In the case of low relief structure at greater depths, the nonstructural effect predominated, often resulting in refraction failures, many of which were subsequently retrieved as "close misses" by independent development.

These nonstructural refraction anomalies appear to be geochemical in origin, and so are considered as additional evidence for the dynamic nature of petroleum accumulation.

●

**JAMES D. HUDSON (Robert H. Ray, Inc.)**

**Practical Principles of Gravity Interpretation With Illustrations**

The fundamental principles of qualitative gravity interpretation are presented and applied to gravity surveys in the following areas: (1) Gulf Coast-Hastings, South Houston, Mykawa and Manvel; (2) East Texas-Hawkins; (3) California-Round Mountain and Rio Bravo; (4) New York and Pennsylvania-Genessee and Beach Hill; (5) Wilson and Aransas counties, fault profiles.

●

**ROBERT H. MILLER (Western Gulf Oil Co.)**

**A New Gravitational Method of Defining Underground Structure**

Calculations made of the shallow gravity disturbances arising from the redistribution of mass in the loosely consolidated formations, due to the warping of the formations over known structures, show that these disturbances are sufficient in magnitude and extent to be measured with a precise gravimeter.

The results from several test areas in the San Joaquin Valley, California, where density contrast is very low, show that these shallow disturbances are diagnostic and occur over the crests of structures as distinct from the apexes. A much higher degree of resolution can be obtained from gravity surveys designed to determine shallow "strain" disturbances.

●

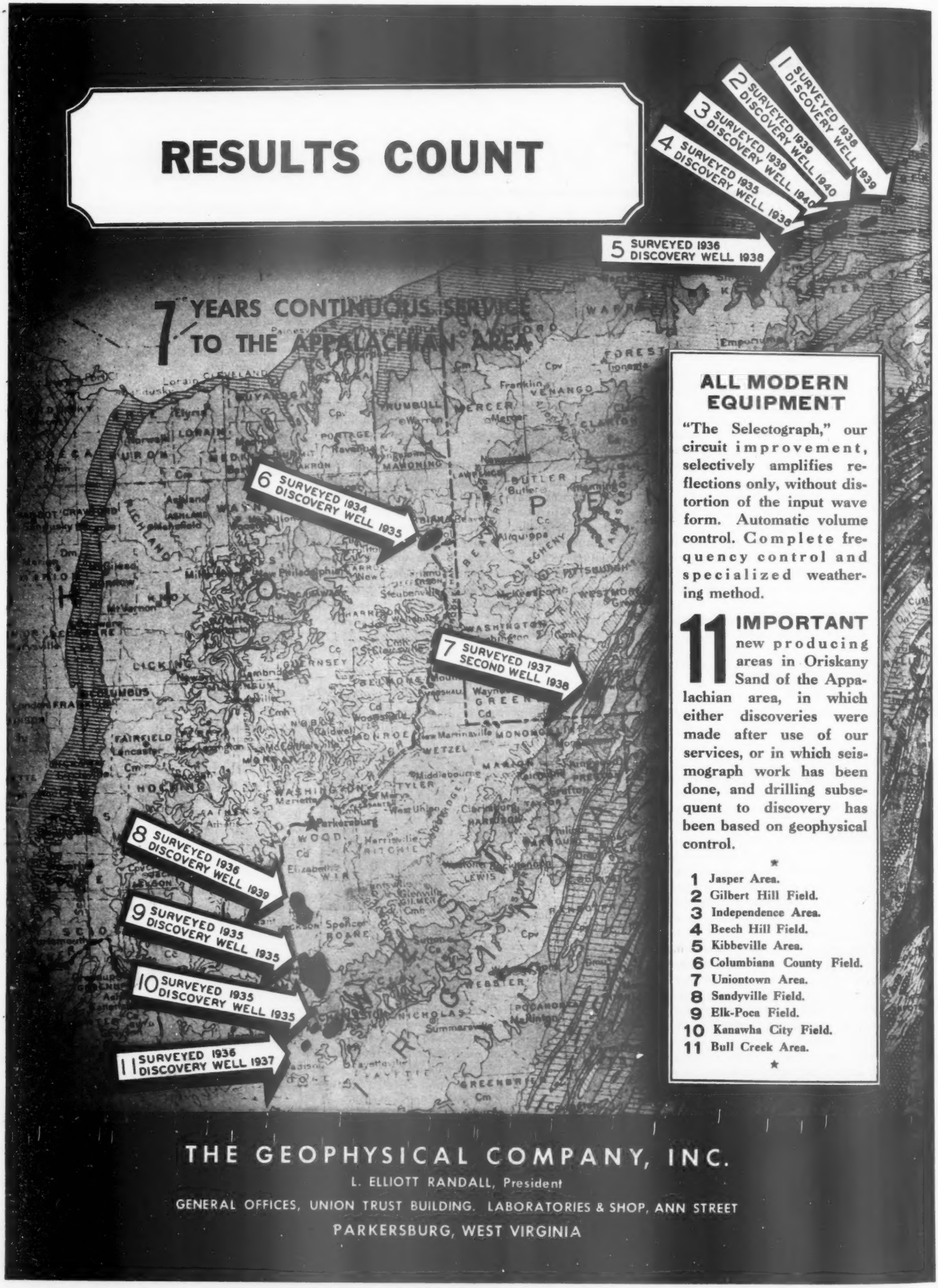
**L. J. NEUMAN (Consultant)**

**Some Factors Affecting the Resolving Power of Electrical Logging Methods**

Two purposes of electrically logging bore holes are: (1) To determine the thickness and subsea position of the formations (geometric properties). (2) To determine information pertaining to the relative permeabilities and fluid content of the formations (physical properties). The resolving power, or the ability of electrical logging methods to accomplish these purposes, is affected by two factors, one, the electrode spacing and arrangement, and the other, the colloidal content of the formations.

Hummel and Rulke (Beitrage Zur Angewanton Geophysik, Vol. 6, Pt. 1, 1936) pointed out that certain electrode arrangements and spacings, under conditions quite commonly encountered in the Gulf Coast, give resistance parameter curves that may bear no direct relationship to the resistivity of the layers comprising the section. The recorded values may be greater or less than the actual resistivity of any layer or any part of the layers traversed. Under some conditions it is not possible to determine accurately the thickness of the layers or the position of the interfaces. Examples of anomalous conditions of this type encountered in actual practice in the Gulf Coast region are given.

The electrical conductivity of a formation is dependent upon the nature, amount, and distribution of fluids contained therein. The ability of colloidal material, under certain conditions, to increase the connate-water content of formations and the resulting effect on electrical logs is discussed and illustrated.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6 SURVEYED 1934 DISCOVERY WELL 1935
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9 SURVEYED 1935 DISCOVERY WELL 1935
10 SURVEYED 1935 DISCOVERY WELL 1935
11 SURVEYED 1936 DISCOVERY WELL 1937
ALL MODERN EQUIPMENT
"The Selectograph," our circuit improvement, selectively amplifies reflections only, without distortion of the input wave form. Automatic volume control. Complete frequency control and specialized weathering method.
11 IMPORTANT new producing areas in Oriskany Sand of the Appalachian area, in which either discoveries were made after use of our services, or in which seismograph work has been done, and drilling subsequent to discovery has been based on geophysical control.
1 Jasper Area.
2 Gilbert Hill Field.
3 Independence Area.
4 Beech Hill Field.
5 Kibbeville Area.
6 Columbiana County Field.
7 Uniontown Area.
8 Sandyville Field.
9 Elk-Poca Field.
10 Kanawha City Field.
11 Bull Creek Area.
THE GEOPHYSICAL COMPANY, INC.
L. ELLIOTT RANDALL, President
GENERAL OFFICES, UNION TRUST BUILDING. LABORATORIES & SHOP, ANN STREET
PARKERSBURG, WEST VIRGINIA

**E. J. STULKEN (Allen Academy)**

**Seismic Velocities in the Southeastern San Joaquin Valley of California**

For the first time, seismic velocity measurements from well surveys have been made intensively enough to justify an analysis of the velocity field in an entire area instead of just along lines between wells. Maps are drawn showing velocity changes in the southeastern San Joaquin Valley of California. A portion of the valley floor in the neighborhood of Bakersfield, about 25 miles wide and 35 miles long, was chosen for study because of the number of wells in it which had been shot for their velocities. Differences in average velocity of 1,700 ft. per second for a constant depth are observed, and horizontal velocity gradients averaging over 100 ft. per second per mile are computed. Correction schemes for the adjustment of seismic data are suggested, and correction maps shown.

An attempt is made to establish a connection between stratigraphy and seismic velocity. Comparative study of the logs of wells and the velocities observed in them yields certain qualitative conclusions, but attempts to express the relation in a quantitative way fail.

●

**PAUL WEAVER (Gulf Oil Corp.)**

**A Theory of the Distribution of Radioactivity Marine Sedimentary Rocks**

Gamma-ray measurements of marine sedimentary rocks indicate that in general the slower the rate of deposition the greater the radioactivity. The most recent measurements of the radioactivity of sea water suggest an increase with depth which indicates a very slow settling of small particles. It is believed that a geologic time scale of sedimentation can be established, subject to certain corrections due to fixation of radioactivity minerals by organisms.

●

**D. H. CLEWELL (Magnolia Petroleum Co.)**

**Problems in the Temperature Control of Gravity Meters**

Modern gravity meters require sufficient temperature control to prevent temperature changes greater than a few millidegrees per hour. Automatic compensation for temperature changes does not at present completely solve the temperature-control problem. When operating with the necessarily high sensitivity, continuous control and relay control of temperature becomes equivalent. Constant distribution of temperature throughout the instrument is as important as control of the average temperature and may be accomplished by conduction, convection or plural points of control.

●

**LEO HORVITZ (Subterrex)**

**On Geochemical Prospecting II**

In the first paper of this series, analytical data were presented to show that hydrocarbons in near-surface soils are associated with oil and gas accumulation at depth. It was pointed out that higher hydrocarbon concentrations are found in the soils over the edges of the accumulation rather than in the near-surface soils over the center of the productive area.

Since publication of this early data, the technique for extracting and analyzing hydrocarbons present in soil samples has been considerably improved. The significant patterns obtained are similar to those originally reported. However, the recent data are more outstanding in that much greater contrast is obtained between the zones of high concentrations and those of lower concentrations, permitting unique interpretations in most cases.

A discussion of geochemical well logging is also included in this paper. Analyses of a large number of well cuttings for hydrocarbons and other constituents indicate that definite relationships exist between the constituents found in the sediments above a petroliferous deposit and the deposit itself.

●

**MERLE C. BOWSKY (Lane-Wells Co.)**

**The Effect of Mud Resistivities on the Intensities of Electrical Logs**

The drilling mud is one of the variables that prevents comparing the actual intensities of electrical logs. This paper deals with the effects of the drilling mud on the intensities of the natural potential and shallow penetration curves.

●

**W. R. RANSONE (Geophysical Service, Inc.)**

**Geochemical Well Logging.**

Collection of well cuttings, their analysis, and subsequent plotting as a geochemical well log are briefly discussed. Many and varied examples of actual Chemlogs are presented. These illustrate specific applications, and also may be employed to form an opinion of the usefulness of the method.

●

**JOHN H. WILSON (Independent Exploration Co.)**

**Gravity-Meter Survey of Wellington Field, Larimer County, Colorado.**

The results of a gravity-meter survey across the Wellington field, Larimer County, Colorado, both before and after the elimination of regional effects is presented in relation to the subsurface structure of the field. The method of eliminating regional effects is given.

This information is presented as a case-book type, illustrating the type of anomaly related to structure that is almost obscured by strong regional effects.

●

**JOSEPH L. ADLER (Independent Exploration Co.)**

**Simplification of Tidal Correction for Gravity-Meter Surveys**

Recent papers by Wolf and Wyckoff have called attention to the considerable effect of lunar and solar tidal forces on the vertical component of gravity but have given no instructions for the computation of this effect. Material published in English on this subject, so far as the author has been able to discover, does not present a rapid, practical method of computation which could be used economically as a matter of routine in gravimeter work. In this paper an attempt is made to analyze the degree of accuracy required in these computations, and a chart is developed from which the tidal correction for any gravimeter observation in the United States can be obtained directly in less than a minute with an average error of less than 0.01 milligal.

●

**N. A. HASKELL (Western Geophysical Co.)**

**The Relation Between Depth, Lithology and Seismic Wave Velocity in Tertiary Sandstones and Shales.**

Velocity data in Tertiary sands and shales, obtained at 62 wells in the southern San Joaquin Valley, California, are considered statistically. A mean vertical velocity gradient of 0.464 ft. per second per ft. is found, and evidence is presented which indicates that, on the average, 0.360 ft. per second per ft., or 78 per cent of the total vertical gradient, is due to the effect of the pressure exerted by the present overburden. It is found that in shales the effect of overburden is smaller than this average (0.240 and 0.231 ft. per second per ft. for two shale formations), and in sandier formations it is greater than the average (0.428 and 0.581 ft. per second per ft. for two moderately sandy formations). However, the velocity vs. depth curves for sands and for shales may intersect at any depth, and it does not appear to be possible, in general, to distinguish between the two solely on the basis of the velocity at a given depth.

Comparison with similar data of Weatherby and Faust for older beds, and with the experimental result of Birch and Bancroft for hard sandstone and slate, suggests that these gradients cannot persist very far beyond the present maximum depth of observation of about 14,000 ft.

●

**ETHEL WARD McLEMORE and PAUL WEAVER**

**The Crosbyton High, West Texas**

The Crosbyton high, the first geophysical anomaly described in West Texas, was recognized as a magnetic maximum by the Coast and Geodetic Survey. Reconnaissance magnetometer and torsion-balance profiles confirmed the maximum. This paper outlines computations as to the depth and form of the basement structure to cause the maximum, and discusses the confirmation of the computations by recent drilling.

●

**EUGENE McDERMOTT and D. S. RENNER (Geophysical Service, Inc.)**

**Seismic Recording Attenuators.**

For recording work such as in exploration seismology, the characteristics of attenuators must be much more carefully considered than has generally been the practice heretofore for several reasons. First, perception is not limited, as for example in sound; second, the wave form should be more accurately recorded; third, because of better control and greatly increased encompassed sensitivity, the range over which the attenuator works has been increased. The performance of best available attenuators is compared to the desired ideal. It is seen that their shortcomings limit the accuracy and quality of results as well as their application. In the face of stringent requirements the necessity for a com-

prehensive examination and understanding is realized.

Two systems are chosen to represent current practice. One is a balanced network of variotransconductor elements and the other a balanced net of varioconductor elements.

●

**H. E. BANTA (Independent Exploration Co.)**

**A Refraction Theory Adaptable to Seismic Weathering Problems**

An exponential relation between depth and velocity of propagation of seismic waves is postulated. The exponent is a number between zero and unity. Expressions for the time-distance relation, the depth-distance relation, the average vertical velocity, and the vertical time-horizontal time relation are derived. Applications of the relations to seismic weathering problems are discussed.

●

**T. A. ELKINS (Gulf Research & Development Co.)**

**Test of a Quantitative Mountain-Building Theory by Appalachian Structural Dimensions**

A mathematical paper by Ross Gunn (Journal of the Franklin Institute, Vol. 224, pp. 19-53, 1937) gives a mountain-building theory which permits calculating certain structural dimensions in terms of thickness and strength of the geologic elements involved. The present paper applies various formulas from Mr. Gunn's paper to the calculation of width and amplitude of folds and to basin depths and mountain heights of the Appalachian Mountain system. The numerical values resulting are in surprisingly good agreement with previously published values measured or estimated from the known geology of the area.

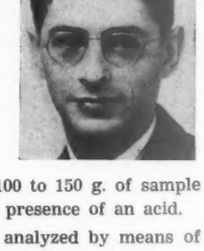
●

**LEO HORVITZ (Subterrex)**

**An Analytical Technique for the Determination of Saturated Hydrocarbons in Sediments**

During the past several years, considerable soil-analysis data have been reported suggesting the association of hydrocarbons in shallow soils with petroleum accumulation at depth. Analyses of well cuttings have also been reported.

This paper describes techniques that have been developed for extracting and analyzing the volatile hydrocarbons contained in shallow soils and well cuttings.



The extraction technique consists in heating 100 to 150 g. of sample at reduced pressure in the presence of an acid.

The extracted gases are analyzed by means of fractionation and combustion methods. The routine procedure involves the separation of the gases into three separate fractions; the first contains the methane; the second, ethane, propane and butane; and the heaviest fraction contains the pentane and heavier hydrocarbons.

A detailed description of the apparatus and procedure is included. Data showing the extraction efficiency and precision of analytical determinations are also included.

**C. A. HEILAND (Colorado School of Mines)**

**A Decimal Classification System for Geophysical Exploration**

In the ever-growing field of geophysical exploration, a comprehensive classification system has been desirable for some time. If reasonably consistent and sufficiently flexible, such system can be expected to be of considerable service in geophysical technology and operation. In research organizations, for instance, it would facilitate proper classification of theoretical and experimental data and thereby increase their usefulness. Operating companies would find it valuable in the filing of drawings, maps, reports, catalogs, and notes. For the individual engaged in geophysical work, the system would be useful in the classifying and filing of references, technical articles, and personal notes. In the libraries of oil companies, consulting companies, universities, and technical institutions, the adoption of such system may be expected to result in a time-saving arrangement of geophysical books and publications.

A decimal system appears to be most suitable for the purpose since certain digits and arrangements thereof can be assigned a definite group significance. However, an entirely self-contained classification, such as Uren's valuable system encompassing the entire petroleum industry, meets with serious objections by librarians since it does not fit into the established systems for classifying technical and scientific literature. Fortunately, it has been found possible to work out a system which, while consistent in itself, can be fitted into both the Dewey system and the Classification Decimale Universelle. Following the precedent set by the latter, the position selected for the new system is 550.800. The decade digits following the 8 are representative of nine groups of geophysical methods. For each of these methods, a consistent use of digits in the unit position signifies such general divisions as rock properties, instruments, interpretation methods, results, statistics, etc. The units are further subdivided into first decimal groups. The application of this classification principle is demonstrated for the entire field of geophysical exploration in a number of tables.

●

**BRUNO PONTECORVO (Well Surveys, Inc.)**

**Radioactivity Analyses of Oil Well Samples**

The information obtained by measuring the radioactivity of well samples is described from the point of view of the usefulness gained from radioactivity well logging.

The radioactivity well-logging method gives a curve of the total gamma radioactivity of the formation vs. depth. The chief difficulties encountered in the correlation between logs and measurements of sample activities are due to the fact that the size of the sample from a given rock is inherently small, and the quantity of this rock represented by well logging is exceedingly large; this geometrical difference results in a different weighting of the various radio elements present in the rock.

A method is described which permits predicting gamma-ray-radioactivity logs by measuring in samples the amount of thorium in equilibrium with its products, of uranium in equilibrium with its products, and of potassium.

The method consists in measuring the activity of a given sample in three different Geiger Mueller counters: beta, beta-gamma, gamma. The apparatus has to be calibrated only once, with "artificial" samples, in which the amount of thorium, uranium, and potassium is known. The method has the advantage of not destroying the sample as happens for the "emanation" method, but it requires considerably larger samples.

The method works because of (1) the difference in the ratio of beta to gamma rays for the thorium family, uranium family, and potassium; (2) the difference of spectra of beta rays from the various radio elements.

●

**M. MUSKAT and H. H. EVINGER (Gulf Research & Development Co.)**

**Current Penetration in Direct Current Prospecting**

Using previously developed methods for calculating the potential about an electrode on the surface of a stratified earth, the fractions of total current, due to two current electrodes, flowing in a given layer and across the vertical plane midway between the electrodes, are calculated. The method employed is applicable in principal to any number of layers, and numerical values are given for two-layer and three-layer earths. Curves are given showing the variation of these current fractions with electrode spacing for the following types of conductivity stratification: Two-layer earths with complete range of conductivity ratios; three-layer earths which are homogeneous except for the middle layer, the latter having thicknesses equal to or twice that of the top stratum; and three-layer earths having either infinitely conducting or resisting bottom layers and with middle stratum thicknesses equal to twice, or three times that of the uppermost stratum.

●

**C. A. SWARTZ and R. W. LINDSEY (Gulf Research & Development Co.)**

**Reflected Refractions**

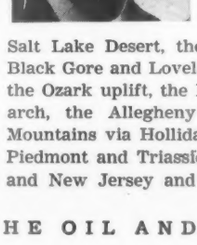
A number of very steep reflections were observed while making a seismograph survey of a salt dome. A time plot of events recorded along a typical profile is shown. The steep reflections came both from the sides of the dome material and from the adjacent upturned sedimentary strata. A particular event of very infrequent occurrence, a reflection from the vertical side of the dome traveling essentially horizontally along a refracted trajectory, is discussed in detail.

●

**GEORGE P. WOOLLARD (Princeton University)**

**A Transcontinental Gravitational and Magnetic Traverse and Its Relation to Regional Geology**

The writer, working under a grant from the Geological Society of America and using a Humble X-type gravity meter, made available to the American Geophysical Union for scientific investigations, and Askania vertical-component magnetometers, established a gravitational and magnetic profile from Morro Bay, California, to Sea Bright, New Jersey. The traverse crossed the San Joaquin Valley, Owens Valley, Death Valley, the Great Salt Lake Desert, the Rocky Mountains via the Black Gore and Loveland passes, the Great Plains, the Ozark uplift, the Illinois basin, the Cincinnati arch, the Allegheny Plateau, the Appalachian Mountains via Hollidaysburg and Harrisburg, the Piedmont and Triassic Lowlands of Pennsylvania and New Jersey and the Atlantic Coastal Plain.



# Abstracts of S. E. P. M. Papers

**Presented before the annual meeting of the Society of Economic Paleontologists and Mineralogists at Houston, Tex., April 2-5**

**CAREY CRONEIS (University of Chicago)**

**Micropaleontology—Past and Future.**

This paper traces the rise of interest in microscopic fossils from the 1660's when Leeuwenhoek's development of the forerunner of the microscope made their study possible, through the several centuries of their sporadic investigation in the interests of pure research by small groups of scientists, to the birth of the utilitarian science of micropaleontology a quarter century ago. The development phases of the science are then outlined, and the progressive multiplication of the micropaleontologic groups studied is considered.

The origin and growth of micropaleontology as a subject in university curricula is reviewed, and suggestions are made for the future expansion and improvement of training in this special field. In addition, consideration is given to the general academic background the prospective paleontologist should acquire in order best to serve his science as well as prove most valuable to the organization which purchases his services.

Finally the future of the science of micropaleontology is analyzed, and suggestions are made for the direction of efforts into new lines of investigation which may prove profitable in enlarging the scientific scope of the field and thus in enhancing its commercial significance.

●

**FRANK E. LOZO (Texas Christian University)**

**Biostratigraphic Studies of Some Texas Comanchean Foraminifera**

This paper considers the variable geographic and stratigraphic distribution of Comanchean Foraminifera of North Texas as influenced by physical and biologic factors. The physical factors are suggested by the observation that certain Foraminifera appear limited in their occurrence to particular types of sediments or to restricted localities. Biologic factors are more difficult to evaluate because of inadequate information concerning living Foraminifera.

●

**HENRY V. HOWE (Louisiana State University)**

**Fauna of the Oligocene Glendon Formation at Its Type Locality.**

Despite the widespread correlation of many faunas from other states and countries with the so-called "Middle Oligocene" Glendon formation of Alabama, no detailed study of the faunal content of the formation at its type locality has previously been published. Available literature records only four species *Ostrea vicksburgensis*, *Pecten poulsoni*, *P. anatipes*, and *Clypeaster rogersi* plus an unidentifiable *Lepidocyclina*. The fauna of the Glendon formation has been described from other than the type locality. This report is essentially a checklist, bed by bed, of the species of invertebrate fossils present in the softer layers. While many more than 100 identifiable species of invertebrates have been obtained, further work will doubtless reveal some additional species. As satisfactory material was obtained from only a few places, a map and photographs of these spots are included.

●

**EDWARD A. FREDERICKSON (University of Oklahoma)**

**Cambrian-Ordovician Boundary in Oklahoma.**

The position of the Cambrian - Ordovician boundary in the Arbuckle limestone exposed in the Arbuckle and Wichita mountains, Oklahoma, has been a subject of controversy. New evidence is offered which further delineates the boundary.

●

**HENRY V. HOWE (Louisiana State University)**

**Use of Soap in the Preparation of Samples for Micropaleontologic Study.**

After most of the clay has been washed from a sample, the addition of enough soap or granular washing powder to cause heavy suds quickly eliminates the remaining mud and frequently removes much iron oxide stain. If the water used to wash the sample is soft, enough of the soap adheres to the Foraminifera, Ostracodes, and certain other shells (even after the suds have vanished) to cause them to be easily floated on the surface of the water. Decanting by this method is particularly useful on sands, such as beach sands, or sandy clays where faunal content is meager. It has the advantage of removing Ostracodes as well as Foraminifera.

●

**HUGH FRENZEL (University of Wisconsin) and MAURICE MUNDORF (Cincinnati University)**

**Fusulinidae From the Phosphoria in Montana**

There has been considerable controversy over the age of the Phosphoria formation during the past decade. Evidence from brachiopods and ammonoids has been construed to indicate a Leonard or Word age for at least a part of the formation, but few fossils from the base and summit of the formation have been studied. A well-preserved fusulinid fauna from limestones just above the Tensleep-Quadrant sandstone, near Three Forks, Mont., is of particular interest for the bearing these fossils have on the age determination of the basal Phosphoria. This is the first record of fusulinids in the Phosphoria.

●

**NORMAN D. NEWELL (University of Wisconsin)**

**Myalinidae in Zonation of the Late Paleozoic.**

A statistical approach to the study of Pennsylvanian and Permian Myalinas reveals simple and regular evolutionary trends that are of great usefulness in stratigraphic work. Because of the relative abundance and diversity some of the Myalinas are guide fossils par excellence among the late Paleozoic Pelecypods.

●

**FRANK V. STEVENSON**

**The Devonian Sly Gap Formation of New Mexico**

Sly Gap, a new formational name, is proposed by the writer for Devonian sediments exposed in Sly Gap, south of Sheep Mountain, New Mexico, in 25-11s-4e, northern extension of the San Andres Mountains. This formation crops out the entire length of the San Andres Range, and throughout the Sacramento and Sierra Caballo mountains. At the type locality, the formation comprises 114 ft. of siltstones, shales, and a few limestones. A tentative Sly Gap faunal list includes 44 genera, represented by 105 species or formae. A comparison of the Sly Gap fauna with other faunal assemblages indicates that the Sly Gap formation is generally speaking, a Hackberry equivalent. The fauna shows some similarities to that of the Martin limestone of Arizona, but little relationship to the faunal assemblages of the Percha of New Mexico, or the Ouray of Colorado.

●

**CHARLES B. READ (Geological Survey)**

**Sequence and Relationships of Late Paleozoic Floras of the Southwestern United States**

*(Published by permission of the director, Geological Survey).*

Sequences of land floras provide data that are very useful in building late Paleozoic chronologies in areas characterized by continental deposition. In the southwestern United States it is possible to relate these floras to marine invertebrate faunas.

The floral sequences of Kansas, North Texas, and Central New Mexico in rocks of late Pennsylvanian and Permian ages are discussed. In Kansas three floras are recognized in the interval between the base of the Virgil and the top of the Sumner. In North Texas four floras can be identified between the base of the Graham and the top of the Choza. In New Mexico three floras can be recognized in strata that have been called upper Magdalena and Abo. Relationships of these floras are shown.

●

**CHARLES B. READ (Geological Survey)**

**Pennsylvanian Formations and Floral Zones in the Central and Northern Appalachian Region**

*(Published by permission of the director, Geological Survey).*

Studies of broad problems of classification and correlation of the Pennsylvanian strata must be based on an understanding of the Appalachian sequences of these rocks. The general features of sections in several important areas in the central and northern Appalachians are discussed.

Nine major floral zones are recognized. These are useful in tracing strata within the province. Likewise they are valuable in establishing correlations between the eastern and Mid-Continent regions. It is held that current tendencies to minimize the importance of the Appalachian sequence and to recognize other than a provincial "type section" of Pennsylvanian rocks in the Mid-Continent region are unwise.

●

**FRED E. SMITH (Union Producing Co.)**

**Micropaleontology of Two Wells on the Fort Morgan Military Reservation, Baldwin County, Alabama**

A comparison of the microfauna encountered in the Danciger Oil & Refining Co. 1 and 2 U. S. Government, with the standard Miocene section of Florida as used by Cushman and Ponton, is made.

●

**R. W. HARRIS (University of Oklahoma)**

**Ostracoda From the Subsurface Simpson of the North Texas Fort Worth Syncline**

Simpson Ostracoda recovered from subsurface cuttings of various wells in Fort Worth syncline indicate a very fossiliferous Chazyan or Oil Creek fauna, as in the Arbuckle Mountain outcrop. Ostracoda from younger Simpson occur above a distinct Oil Creek unconformity.

●

**J. A. CUSHMAN**

**Some Suggestions for Ecologic Studies of the Foraminifera**

So little is known about the relationships of Foraminifera and their environment that the field is practically new. Studies of Recent species are being made in several areas but many more are needed. The knowledge of ecologic conditions under which fossil Foraminifera lived may have an important bearing on their use in discovery of areas favorable to the accumulation of petroleum.

Bachrach photo

●

**R. W. HARRIS and W. H. THAMS (University of Oklahoma)**

**Simpson Ostracoda of the Cumberland Area of Southern Oklahoma**

Many species of Bromide and Tulip Creek Ostracoda have been recovered and identified from Cumberland well cuttings. These species are illustrated in lantern slides and their subsurface range correlated with known range in Arbuckle Mountain outcrop.

●

**NORMAN D. NEWELL and BERNHARD J. KUMMEL (University of Wisconsin)**

**Permian-Triassic Relations in the Middle Rockies**

Search for rocks of uppermost Permian age in the region of the Middle Rockies reveals a marked eastward overlap of the Dinwoody formation and equivalents on the Phosphoria formation. Uppermost Phosphoria (black shale) and lower Dinwoody beds are progressively overlapped from Southeast Idaho into Central Wyoming. The Dinwoody faunas are diverse, relatively well preserved, and certainly are lowermost Triassic in age.

# Abstracts of A. A. P. G. Papers

*(Continued from Page 58)*

edge areas, the producing area closely follows the extent of the sand. The producing area varies in width from less than 1 mile to about 3 miles. Cross-sections show that the sand pinches out in both directions at right angles to the trend and the linear shape strongly suggests a buried beach. Although only the southwestern part of the trend is considered in the paper, the trend is known to continue northeastward to Fink Creek, Lewis County, a total length of over 55 miles.

Within the sand body the adjustment of oil and gas to structure is very good, with oil in the synclines and gas on the intervening anticlines. No areas containing only water in the Berea sand are known along the trend.

Secondary recovery of oil by means of gas drive is being tried near Spencer, on an experimental basis, with encouraging results.

●

**PAUL H. PRICE (State Geologist, West Virginia Geological Survey) and A. J. W. HEADLEE (Chemist, West Virginia Geological Survey)**

**The Geochemistry of Natural Gas in the Appalachian Province**

This paper contains the results of further studies on the variations in the composition and properties of natural gas by geologic and geographic distribution.

New data corroborate the composite regional variations previously published. The regional map has been extended to include the gas and oil fields in Canada which lie in the Appalachian province north of Lake Erie.

*A. J. W. HEADLEE*

Well-to-well variations in the composition of the gas in several individual reservoirs are given. Definite relationships exist between the composition of natural gas and associated oil both areal and quantitative.

●

**KENDALL E. BORN (State Division of Geology, Nashville, Tenn.)**

**Oil and Gas Possibilities in the Northern Cumberland Plateau (Published with the permission of the state geologist)**

The northern Cumberland Plateau is surfaced with sandstones, shales, and coals of Pennsylvanian age which aggregate over 3,000 ft. in thickness. The Coal Measures are underlain by 900-1,000 ft. of Mississippian rocks which, in turn, rest upon as much as 200 ft. of Silurian beds that thin out rapidly to the west where the Chattanooga shale is underlain by Ordovician strata.

Structurally, the northern Cumberland Plateau is a monocline dipping gently to the east toward the highly folded and faulted Appalachian structural province. The plateau is bordered to the northeast by the Pine Mountain thrust block and to the east and southeast by the Cumberland Mountain-Walden Ridge fault system. Strong secondary faults are present in southern Morgan County. Within the plateau proper gentle dips prevail.

The upper and middle Mississippian strata have been productive in the Oneida and Glenmary areas in Scott County, respectively, and the Fort Payne of lower Mississippian age is the producing formation in the Boone Camp pool in northern Morgan County.

**PARK J. JONES (Texas Co.)**

**Introduction to a Technique for Estimating Oil Reserves**

The volume of oil ultimately recoverable from reservoirs is a function of a number of variables, the more pertinent of which may be listed as follows: (1) Types of porous media; (2) sources of pressure; (3) reservoir volume factors; (4) connate-water contents; (5) porosities and pay thicknesses; (6) permeabilities and permeability distributions; (7) selective location and selective completion of wells; (8) rates of recovery; (9) total or partial pressure maintenances; (10) secondary-recovery methods; (11) crude prices, and (12) economic limits. The volume of oil ultimately recoverable from individual properties is also a function of the listed variables but in addition it depends upon migration of oil away from or into the said properties.

A method of estimating oil reserves from 19 different combinations of porous media and chief sources of pressure is presented in terms of pay-thickness, porosity, connate-water, reservoir-volume factors, permeability ratios, and operating methods relative to current oil prices and economic limits.

●

**EDWIN A. DAWSON (Consulting Geologist, Shawnee, Okla.)**

**Producing Pennsylvanian Sands of Central Oklahoma**

Discovery and development of numerous Pennsylvanian sand pools in Central Oklahoma lately has focused attention on this phase of potential reserves in the area. This paper reviews the stratigraphic position, areal distribution and some production data vital to Central Oklahoma.

●

**MAX W. BALL (Consulting Geologist, Edmonton, Alta., Canada); T. J. WEAVER (American Production Co.) and DOUGLAS S. BALL (Colorado School of Mines)**

**Shoestring Sand Gas Fields of Michigan**

The "Michigan stray" sand, from which most of Michigan's gas is produced, consists of a series of sand bars formed on offshore shoals in a shallow Mississippian sea. The shoals that caught the bars are on long, anticlinal trends, the sea-floor topography being determined partly by structure and partly by erosion during a previous period of emergence. In some fields enough data are available to show the size, shape, and configuration of the bars, and in at least one the sea-floor topography has been worked out, and the cause and manner of deposition of the bar are plain. The main bar formed against a small subsea hill, the top of which may have protruded as an island, and a smaller bar formed on a lower shoal on the opposite side of a cross channel through which enough current passed to keep the channel almost, but not quite, free of sand.

*MAX W. BALL*

The sand bodies are of some magnitude. The largest so far explored is about 8 miles long and 3 miles wide and held about 50 billion cubic feet of gas. Here three parallel bars were formed and eventually coalesced into a single great bar, featured by three main undulating ridges with intervening hollows.

**LUTHER E. KENNEDY (Chairman of Committee of Tulsa Geological Society)**

**Occurrence of Oil and Gas in Pennsylvania Sands in North Central and Northeastern Oklahoma and Southwestern Kansas**

The oil and gas-development maps of the northern Mid-Continent show the vast number of producing wells and fields in North Central and northeastern Oklahoma and in southeastern Kansas. These are generally described as being old Pennsylvanian pools, about which geologists in general know few of the details. This paper is a joint effort of a number of geologists to divide this production into different stratigraphic horizons. A series of four maps show where oil and gas are produced from sands in the Pennsylvanian below the base of the Cherokee, in the Cherokee formation itself, in the interval between the top of the Cherokee and the Checkerboard limestone, and in the interval from the Checkerboard limestone to the top of the Pennsylvanian.

●

**J. A. MULL (Republic Natural Gas Co.)**

**Stream Channels Applied to the Arbuckle of the Central Kansas Uplift**

The Arbuckle surface on the nucleus of the often-rejuvenated northwest-southeast trending Central Kansas uplift was exposed as a land mass at intervals previous to first Pennsylvanian sea invasion, for sufficient time to permit the positive and negative features of topography to be well developed. Subsequent movements have not greatly altered the detailed topography on this nucleus. As a consequence, dendridic and radial drainage patterns can be traced by well control throughout the area. These channels are largely responsible for the separation of most of the buried hills which are now productive of oil. Outside the nucleus of the uplift, the above principles still apply, although they play a minor role in some areas as a result of early Pennsylvanian movement.

●

**E. W. GALLIHER (Barnsdall Oil Co.) and E. R. ATWILL (Union Oil Co. of California)**

**Progress of Stratigraphic Studies in California**

Many geologists in California have been converted to the belief that the stratigraphic type of trap will provide a majority of future oil fields in the state. Therefore, considerable impetus has been given to the study of sedimentation from every possible approach.

*E. W. GALLIHER*

This paper presents the various methods now used in California to study sedimentation and stratigraphy, describing briefly the results obtained to date and analyzing the future trend of this type of work.

## THE FIFTH DIMENSION

### . . . in the Oil Industry

*(Continued from Page 44)*

coast—just as vulnerable to attack as refineries would be. Greater protection for all vital industries will be provided in the coastal areas.

### Industry's Efficient Labor Records

Turning to the matter of labor supply and labor relations, we recall that this industry has never had anything like a major strike. And there is a reason. It has mobilized an exceptionally fine type of loyal employes, including the best scientists and technologists, mechanics and skilled labor. It has held them, because it has deserved them. During a decade of depression this industry has known no unemployment, while the level of wages has been raised and working hours have been reduced. As regards its labor relations, Dr. Isador Lubin, commissioner of the Bureau of Labor Statistics, declared during the T.N.E.C. inquiry that for many years he had held up the oil industry as a model in all these regards.

### Further Regulation Unnecessary

If it is left unhampered by governmental interference, the oil industry can give full assurance that it will meet every requirement. It needs no regulation. Rather, I firmly believe that government regulation of an industry of this kind, and most industries, can only produce inefficiency. That was the experience in the last war. In one industry with which I have some familiarity the Government's attempt to control labor and operating conditions caused a loss of 30 per cent in efficiency. Any attempt to centralize control of the oil industry, or of industry in general, more than is absolutely necessary, is just creating new bottlenecks; and bottlenecks which retard production are already too much in evidence. A well-organized industry such as ours, with experience, and with a record of accomplishment such as no other industry can boast, can and will function more efficiently as a free industry than if it is subjected to new and burdensome regulations. There are already plenty of laws and rules to guarantee protection of labor under any conceivable conditions. These laws and rules should be obeyed, and in the oil industry they are being obeyed, and more; the oil industry has always gone far beyond any legal requirement in maintaining attractive employment conditions. The real danger, the real menace of inefficiency, lies in bureaucratic domination by inexperienced people; in the multiplicity of reports that are required, the imposition of impractical conditions, the weaving of red tape with no useful purpose but at heavy cost. Loyalty to an industry or to a job can easily be destroyed when it becomes apparent that those responsible for the output of the industry or the job have no effective control over the organization.

There should be no bottlenecks in the oil industry to interfere with production adequate to meet requirements of today—which are the greatest in our history—plus any conceivable emergency increase, for the next 2 years. I am told that during that time no increase of over 10 or 15 per cent can be expected; but, if and when additional supplies are required, whether within 2 years or thereafter, the oil industry is so flexible, so easily adaptable to any program of expansion, that all requirements can and will be met. Our known reserves are the greatest in our history; our whole setup of production, transportation and manufacturing can be expanded with practically no disturbance to the industry. The only bottlenecks that need be feared would be such as would result from the sort of interferences I have suggested—well meant, but impracticable; interferences that would prevent the industry from quickly and efficiently responding to demands. Competition in the industry is the most vigorous in its history; prices are low; profits are low; profiteering cannot honestly be charged, because it does not exist. The industry has done an efficient job; why mess it up? It will continue to do its part with a patriotism not surpassed by any other industry or any group; but it should be permitted to do its difficult job in the manner best known to it, and which will produce results.

There need be no bottlenecks in the oil industry such as exist in the manufacture of those types of equipment for which tools and supplies have to be specially provided. We have full confidence that every requirement of industry will be met, through the efficient functioning of the National Defense Commission, composed as it is of men experienced in dealing with the varied problems of large-scale production.

In conclusion, let me recall what I said a little bit ago about the miraculous achievements of the petroleum geologists in keeping our supplies of oil always ahead of requirements. No matter how much we have used, or how fast consumption is increased, they have always furnished us with more than enough. In the bright lexicon of the petroleum geologists the word DEFICIT doesn't appear. So as a last observation I am going to suggest that the American Association of Petroleum Geologists appoint a committee of its experts to consult with the Bureau of the Budget at Washington. What that bureau needs nowadays is the advice and counsel of an organization like your own, which has always specialized in surpluses rather than in deficits.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# How Mission *"Rolling Dogs"*

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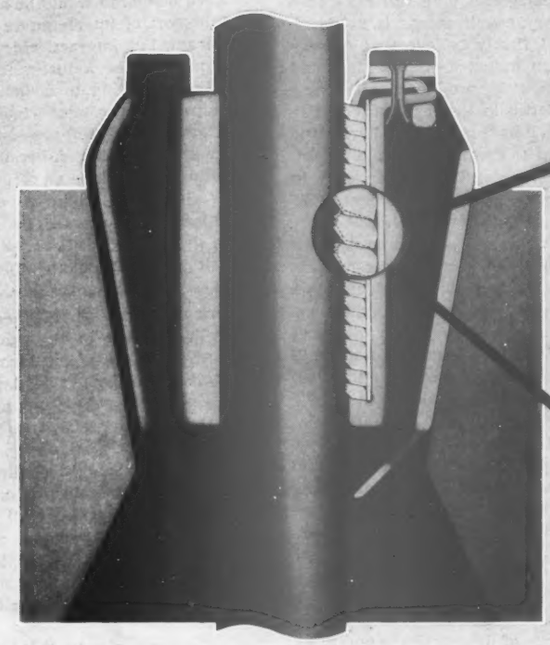
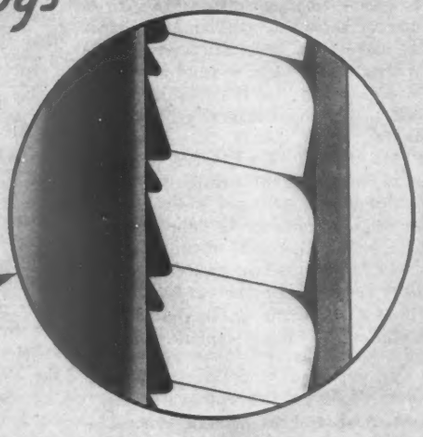
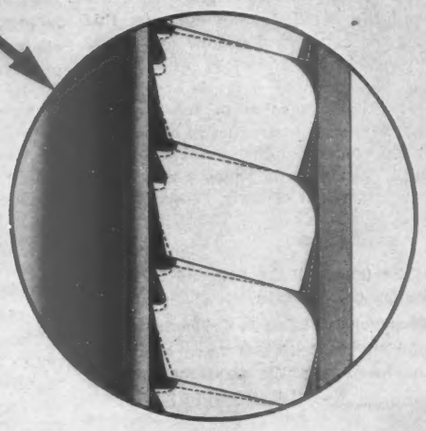




***GRIPPING.*** **When pipe is being supported by slips, the small non-continuous dog teeth grip the pipe with minimum damage. The dogs are shown in supporting position.**



***RELEASING.*** **When the load is taken off the slips, the dogs roll upward and away from the pipe as indicated—releasing the pipe and releasing the slips from the bowl.**

MISSION Slip dogs roll upward and away from the pipe as it is lifted—assuring instant release of the pipe and preventing slips from sticking in the bowl.

In addition to assuring instant release, Mission Slips help to speed up round trips in other ways. Light weight, perfect balance and well designed handles *save time* and *reduce operator fatigue.*

**Pipe is Protected.** Ample gripping area prevents bottlenecking and small, non-continuous teeth prevent undue stress concentration and corrosion fatigue.

**Check Up!** Make sure you have a set of Mission Slips for every pipe handling need. Mission Manufacturing Company, Houston, Texas, Export Office, 30 Rockefeller Plaza, New York.

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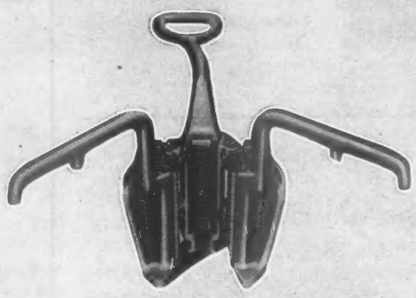
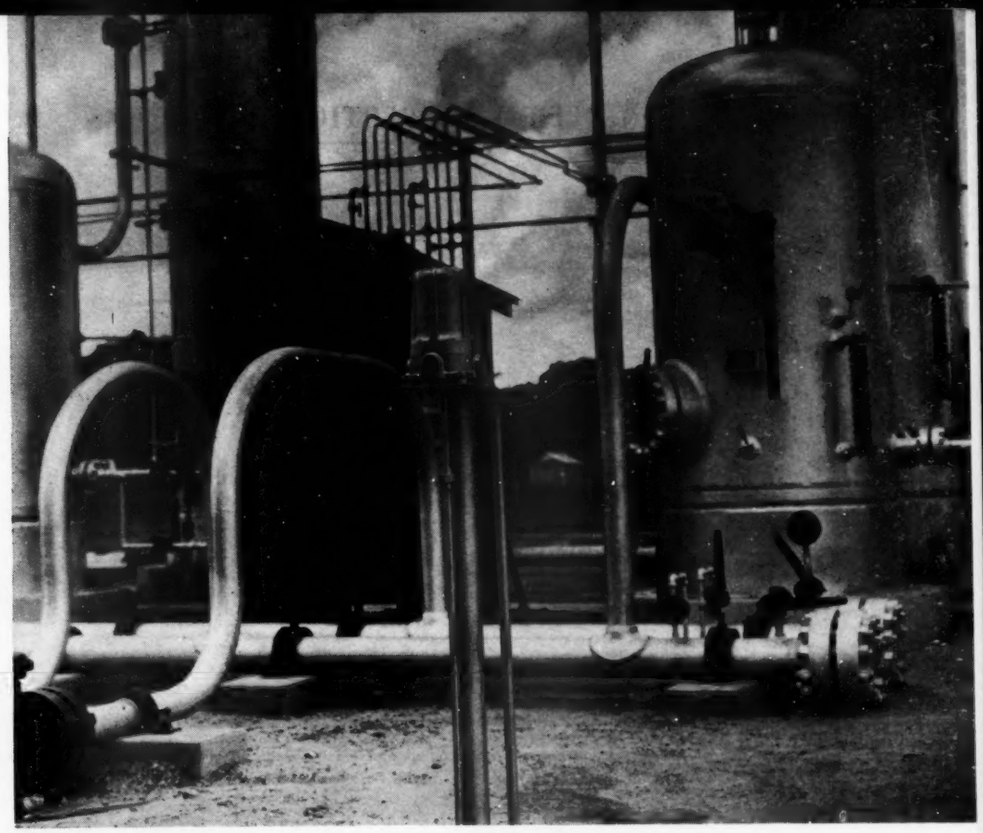
**ROLLING DOG SLIPS**



**Mission "Rolling Dog" Slips**
**One Piece Type**

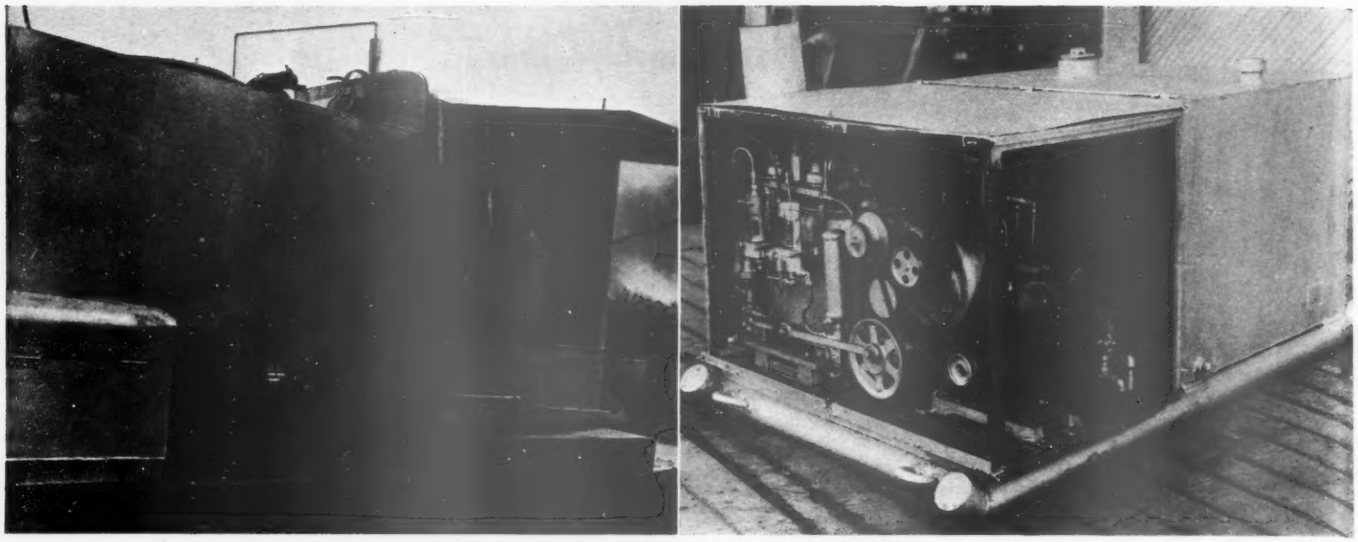


*In the event of a fire or explosion in refineries, natural-gasoline and gas-cycling plants, modern safety provisions lessen the possibilities of the mishap getting entirely out of hand without unnecessarily endangering the lives of operators. At this cycling plant near Palestine, Tex., the safety switch shown here closes all valves on incoming gas and dumps the absorbers of all gas and absorption oil in one operation. Other switches throughout the plant control each operation*

# ENGINEERING & OPERATION

## *In This Section*

APRIL 3, 1941



*Left: Combination water-loading pump and electric generating plant mounted on the truck. The steam generator can be seen under the hood at the right. Right: Details of construction of steam generator can be seen in this skid-mounted unit*

# Portable Steam Plant Used for Removing Paraffin in Illinois

By HARRY F. SIMONS

**In several Illinois fields steam supplied by a portable generator is used to remove paraffin depositions from the tubing, flow lines and tanks. The portable steam generator used is truck-mounted and is capable of developing a pressure of 350 lb. in 2 minutes after starting; it has a 30-hp. capacity and will supply continuously 50 lb. of steam through a ¾-in. orifice. On most jobs only 5 minutes are required for rigging up once the truck reaches the well or battery location.**

PARAFFIN coming out of crude oil produced from wells and depositing in the tubing, flow lines and tanks is being removed by steam supplied by a portable generator in several Illinois fields. The method was first employed in the Louden area of Fayette County and during the colder months its use has become widespread. It is also used in other fields to prevent plugging of the flow lines due to the paraffin. Trouble from deposition of paraffin is only moderate in Illinois being much less than it is in many other areas; the temperature is lower than most oil-producing areas and the trouble increases during the winter time.

The portable steam generator used for this work is mounted on a truck and is capable of developing a pressure of 350 lb. per sq. in. in 2 minutes after starting. It has a capacity of 30 hp. and will supply continuously 50 lb. of steam through a ¾-in. orifice. It is tested to 500 lb. per sq. in. pressure. The steam produced is very dry and is practically the same as superheated steam. Generally from 50 to 100 lb. per sq. in. steam pressure is sufficient for most jobs, the pressure capacity of the plant being utilized only in unusual cases. One of its principal features is the speed with which it can be rigged up, only 5 minutes being required for most jobs.

### Cleaning Flow Lines

Widest use for the steam generator so far has been the removal of paraffin from the flow lines and for treating oil and the elimination of tank bottoms. It also has been used for the removal of paraffin from tubing while it is in the well and for cleaning out tubing and rods when they are out of the well. It can also be used for cleaning off equipment and for thawing out lines around a rotary rig during very bad weather.

For the removal of paraffin from flow lines, the well is kept on production and is pumped in the normal manner. The steam discharge from the generator is connected into the bleeder line on the well head and a pressure gage installed. Pressure required for the cleaning of the lines at Louden varies from 10 to 300 lb.

The gage reading drops as the paraffin is removed from the lines and will stand at zero when the line is completely cleared. The pressure is applied slowly to prevent plugging of the line by compaction of the paraffin before it is melted. Generally from 30 minutes to 1 hour is required for clearing a flow line. More than 1,500 jobs have been performed with the two units operating in the Louden field, the length of the lines treated varying from 100 ft. to 2,500 ft. During cold weather most of the flow lines will require treatment about every 30 days.

In case the line is completely plugged, it is impossible to open it with the steam treatment and the line will have to be fired. Bell holes dug along the line are filled with crude oil which is burned, the heat being sufficient to melt the paraffin. This is the method which was used for clearing of the lines prior to the introduction of the steam treatment. In addition to the time required and inconvenience of the firing method, the concentration of the heat at one point causes coking inside the line and it will eventually be plugged entirely by a very hard material. Lines which were partially coked up have been cleared by repeated steam treatments.

### Cleaning Tubing

Most of the paraffin deposition in the wells at Louden occurs in the upper part of the tubing, the top 200 or 300 ft. On a well which had considerable gas, the tubing was cleaned while it was in the hole. The steam was connected into the casing head and the flow line closed until the tubing was heated. The flow line was then opened and the well put on production. After about 45 minutes the gas pressure in the well helped shove the paraffin out into the flow line.

The tubing is cleared of all obstructions each time it is pulled from the hole. A steam hose is connected to the steam generator and the other end placed in the box end of the tubing while it is laying on the rack. Threads in the box and on the pin are blown off with the steam and the entire rod string and the boxes and pins of each joint are blown free of paraffin.

### Treating Oil

One of the handiest applications of the steam generator has been its use for the treating of oil in tanks which is unsuitable for sale. There is

some water and some emulsion produced with the oil from part of the wells in the Louden field. The amount of bad oil is often not enough to justify the installation of treating systems and cold treatment is used in many cases.

By "rolling" the tanks with steam, adding a small amount of chemical and heating to 90° F., the oil can be prepared for delivery to the pipe lines. For this purpose the discharge from the steam generator is connected into the bottom of the tank and from 60 to 80 lb. pressure applied on the line. The temperature of the oil in a 140-bbl. tank will reach 90° F. in about 2 hours' time, from an original temperature of 30° F., and the steam can then be shut off and the tank allowed to cool.

Generally about 1 gal. of chemical treating compound is added to the tank, half of that amount being put in the oil before the heat is applied and the balance placed in the tank after about 1 hour of heating. Grindouts are taken at intervals to check the progress of the treatment. In many cases the water will be washed out of the oil and the emulsion broken with a temperature as low as 80° F. and this reduces the time required for the job.

Removal of water and emulsion from oil in treating tanks takes longer as the production from the wells is being added during the job and there is a greater volume of oil which must be heated. Normally about 4 hours is required for bringing a tank to the desired temperature.

Before heating a tank of oil, the hatches are opened and the steam is applied slowly. Care must also be taken not to have the tank too full of oil as it will boil over when the heat is applied and rolling started.

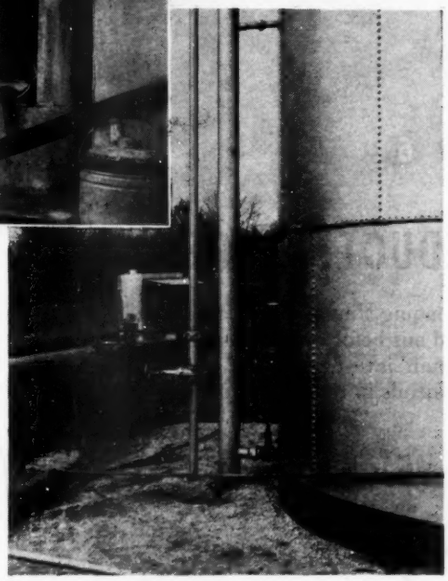
### Quickly Rigged Up

The connecting up of the steam-generating unit requires about 5 minutes for any-type job. The steam line has a universal-type union on each joint and is more like a steel hose than a pipe line. Ordinarily, the unit can be used for five or six jobs a day and in some cases one unit has performed as many as 14 jobs in a day. Where very mild conditions are being corrected, only about 15 minutes may be needed for the treatment. The steam-generating unit doesn't have a chance to get cold between jobs.

The heater is mounted on a 1½-ton truck with water and fuel tanks. A feed pump and a fuel pump supply the water and oil to the generator and a water trap removes the moisture from the discharge steam. Fuel used is No. 3 fuel oil, or better, and it is mixed with an air stream from a blower and fired in a combustion chamber housing two sets of water coils. The continuous fire is kept going by an ignition system consisting of a magneto and spark plugs. A small internal-combustion engine drives the equipment used on the generator. The truck also holds a water-loading pump and an electric generator to supply current for lights; pump and generator are driven by a small internal-combustion engine. Steam, water and fuel gages are provided.

The steam generating unit is completely automatic and in case the water gets too low the fire is cut out. Excessive pressure on the steam coils will automatically stop the fire in the combustion chamber. Both the water pump and fuel pump are bypassed so they cannot force too much fuel or water into the steam generator. Fuel consumption of the steam-generating unit is very low, approximately 10 gal. of No. 3 fuel oil being required for an hour's operation while 125 gal. of water is sufficient to run the unit continuously for 1 hour.

*Steam-generating unit consists of a heating chamber containing two sets of coils, water pump, fuel pump, blower, magneto, small internal-combustion engine and water trap. Water and fuel tanks at right*



## High-Temperature Cooling of Multicylinder Gas Engines

The gas-engine-power committee of the Industrial and Commercial Section of the American Gas Association recently issued its 1940 report in which studies made of high-temperature cooling of multicylinder gas engines were discussed. The committee reports on 46 natural-gas engines (varying in size from 40 to 250 hp.), which were observed over periods of from 12 to 18 months of operation at cooling-water temperatures from 215° to 230° F. These engines were periodically inspected during operation and subsequently torn down for detailed micrometer inspections.

It is reported that (1) dependability has been as good in all cases, and in many instances better, than engines operating at lower cooling-water temperatures; (2) oil consumptions have been no greater; (3) cylinder wear has been normal, and in some cases phenomenally low; (4) piston rings were entirely free and clean; (5) engine-head gaskets of standard materials have held perfectly in all cases; (6) bearings were in excellent condition; (7) condensation (water in oil sump) was entirely eliminated; (8) dynamometer tests showed a slight increase in engine horsepower under full-load conditions with the same quantity of fuel, indicating possible reductions in "oil drag" at higher cooling temperatures.

As a result, the A.G.A. committee feels that "it is now possible safely to advocate the use of high-temperature cooling wherever waste heat may be utilized to advantage in conjunction with the operation of a natural-gas engine." The advantages of waste-heat recovery through the "high-temperature cooling" method were (1) the ability to recover approximately 50 per cent of the heat value of the fuel (in addition to the 25 per cent converted into useful work); (2) waste-heat recovery both from jacket water and exhaust gases without upsetting the balance in the engine-cooling system or affecting the temperature differential in the engine itself, regardless of variation in operating conditions; (3) automatic compensation for fluctuations in external-heat demand or engine load, without adjustment by plant operator.

●

*Left: Steam-generating unit connected to treating tank for heating oil and removal of water and the breaking of the emulsion in the oil. Below: Cleaning tubing and rods laying on a rack with a steam hose. The truck with the steam generator is in the background*

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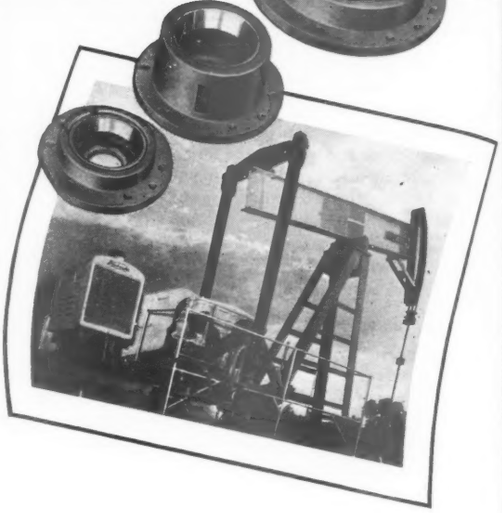

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# Determining Potentials by Drawdown Methods

By CHARLES RODD
Gulf Oil Corp., Chase, Kans.

**A.P.I.—Paper presented before Mid-Continent district of the American Petroleum Institute, Division of Production, at its spring meeting held in Amarillo, Tex., March 21-22, 1941.**

DURING the past 2 years the drawdown method of determining well potentials has largely supplanted the physical method of testing wells previously used in Kansas. The Kansas Conservation Department estimates that 90 per cent of all wells completed in Kansas during 1940 were tested by the drawdown method.

The term "drawdown" derives from the fact that this type of test necessitates the determination of the reduction or "drawdown" of bottom-hole pressure, or fluid level, of a well at one or more stable rates of production. When the drawdown of a well is directly proportional to the liquid production, the pressure-flow relationship may be expressed quantitatively by a constant which is commonly referred to as the productivity index of the well. Depending upon the method of testing and the instruments used, the productivity index may be expressed in barrels per day per pound reduction in bottom-hole pressure, or barrels per day per foot drawdown.

It is not desired herein to arouse any controversy regarding whether or not a straight-line relation between production and pressure exists in all wells, or in any extremely large well to the point of zero bottom-hole pressure. Several thousand wells in Kansas have been tested by the drawdown method. In all but a few of the tests the relationship between pressure and fluid production was approximately a straight-line function between the limits of production required under Kansas proration rules (see Fig. 1). Numerous wells, with fluid capacities ranging up to 2,000 bbl. per day were tested to near capacity without deviating from the straight-line relationship. This relationship may be stated algebraically as follows:

$$C = \frac{Q}{P_r - P_b} \qquad (1)$$

Where:

$C$ = productivity index factor, barrels per 24 hours per pound pressure drop
$P_r$ = static reservoir pressure, pounds per square inch
$P_b$ = equilibrium bottom-hole pressure, pounds per square inch at rate $Q$
$Q$ = production rate, barrels per 24 hours.

Then:

$$Q \text{ max.} = CP_r \qquad (2)$$

Where:

$Q$ max. = total well capacity, barrels per 24 hours.

Also:

$$C = \frac{Q_2 - Q_1}{P_1 - P_2} \qquad (3)$$

Where:

$Q_1$ is the production rate, barrels per 24 hours at the equilibrium bottom-hole pressure $P_1$.
$Q_2$ is the production rate, barrels per 24 hours at the equilibrium bottom-hole pressure $P_2$.

From Equation 3 the well capacity may be expressed as:

$$Q \text{ max.} = CP_1 + Q_1 = CP_2 + Q_2, \text{ etc.} \qquad (4)$$

Bottom-hole-pressure gages, of which there are several types and makes, have been used for several years for obtaining subsurface well data. However, the drawdown method of determining well capacities was not widely used in Kansas and was not adopted as an official method of computing well potentials for proration purposes until after the introduction of fluid-level measuring devices.

### Potentials From Fluid-Level Data Only

Approximately 95 per cent of all drawdown potentials in Kansas are determined from fluid-level data alone, without the necessity of considering the other elements comprising the bottom-hole pressure of a well. This is possible because of the fact that the principal producing formation in Kansas—the Arbuckle dolomite—produces gas in such small quantities that its effect on fluid density is negligible. Practically all Arbuckle wells, as well as some wells producing from other formations, are equipped to pump immediately upon completion.

In wells of this type, it has been found that the density of the fluid column in the annulus between casing and tubing does not change appreciably when the rate of production is changed, provided the well is tubed to near bottom and sufficient submergence is maintained above the tubing perforations to keep the small amount of gas present in solution. Such wells are usually produced, or can be produced, without pressure at the well head, and the effect of the gas column in the well is negligible. Under these conditions the height of the fluid column above the top of the producing formation is proportional to the bottom-hole pressure and may be substituted therefor in Equations 1, 2, 3, and 4. The productivity index under these conditions is usually expressed directly as barrels per 24 hours per foot drawdown. In actual practice the distances to the liquid levels are used directly in determining the productivity index, the height of the fluid column being used only in calculating the well capacity. This may be expressed as follows:

$$C_1 = \frac{Q_1}{d_1 - d} \qquad (5)$$

Where:

$C_1$ = productivity index factor, barrels per day per foot drawdown
$Q_1$ = production rate, barrels per 24 hours
$d$ = distance in feet, casing head to static fluid level
$d_1$ = distance in feet to stable fluid level at production rate $Q_1$

Then:

$$Q \text{ max.} = C_1 (L - d) \qquad (6)$$

Where:

$L$ = depth in feet, casing head to top of producing formation.

The use of Equations 7 and 8 requires the determination of the static fluid level, and assumes a constant fluid density under static conditions. A constant density would not exist at the static condition if the well produced appreciable water. Furthermore, it is frequently impractical to obtain the static fluid level, as this might require shutting in the well for an extended period. It is, therefore, frequently necessary to produce a well at

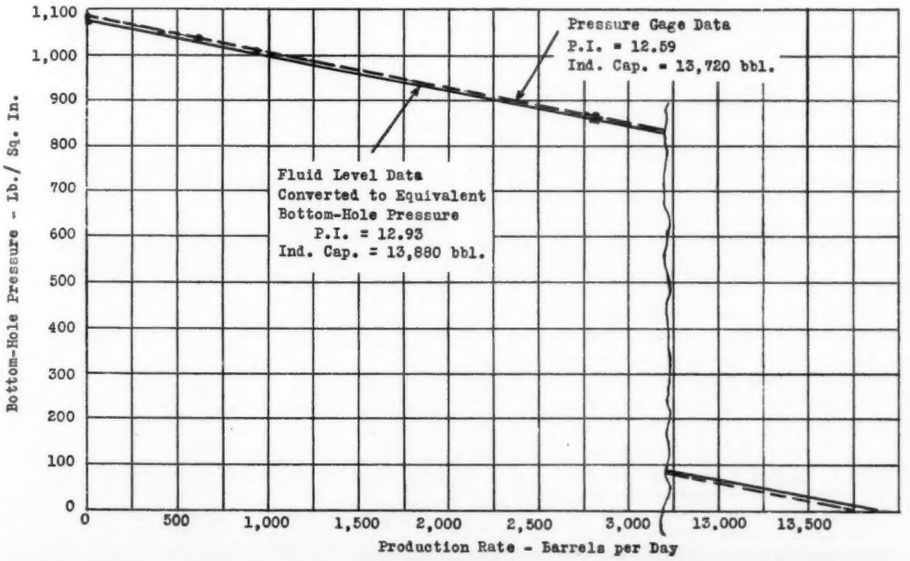


*Fig. 1—Comparative pressure gage and fluid-level data showing straight-line relationship to 2,800 bbl.*

two stable rates, determining the fluid level at each rate. Under producing conditions, oil will tend to displace water in the annulus until a stable condition is reached and only oil remains in the annulus. The well must, of course, be tubed to the top of the producing formation so that water will not accumulate below the tubing.

When two producing rates are used, the relationship may be expressed as follows:

$$C_1 = \frac{Q_2 - Q_1}{d_2 - d_1} \qquad (7)$$

Where $d_1$ and $d_2$ are, respectively, the distances in feet to the stable fluid level at rates $Q_1$ and $Q_2$. Then:

$$Q \text{ max.} = C_1 (L - d_2) + Q_1 = C_1 (L - d_2) + Q_2, \text{ etc.} \qquad (8)$$

### Kansas Rules for Drawdown Potentials

Kansas proration regulations for drawdown potential tests require that fluid-level data be determined at three stable production rates. The purpose of the third rate is to reduce the possibility of errors and to make certain that a straight-line relationship actually exists in the well being tested. The lowest rate of production must be at least 5 bbl. per hour and the intermediate and high rates must be at least 10 and 15 bbl. per hour respectively. A spread of 10 bbl. per hour between high and low rates and 4 bbl. per hour between any two rates is required. (Exceptions to these rates are made for small wells.) Stabilization of the fluid level or pressure within a limit of 5 ft., or 2 lb., per hour is required for each production rate and the well must be gaged for 3 hours at each rate after stabilization is reached.

The productivity indices between the low and high rate and between the low and intermediate rate are determined by Equation 7, and an average of the two indices is used in Equation 8 to determine the well potential. If the calculated capacity is less than 3,000 bbl. of fluid the well receives an official potential equal to the calculated liquid capacity if no water was produced. If water was produced the average percentage of water times the calculated liquid capacity is deducted from the capacity to arrive at the potential figure. (See Table 1.)

If the calculated capacity is in excess of 3,000 bbl. liquid, the well is given a maximum potential of 3,000 bbl. less a deduction for percentage of water if any water was produced. . . .

### Potentials From Bottom-Hole-Pressure Data

Approximately 5 per cent of the drawdown potentials in Kansas have been determined either by bottom-hole-pressure gages or by fluid-level-measuring devices, using what is commonly called "the back-pressure method" of determining bottom-hole pressures.

Wells producing considerable gas normally have a varying fluid density in the annulus between tubing and casing, and normally are produced with some pressure on the casing. The liquid level in such wells is seldom proportional to the reduction in bottom-hole pressure and consequently cannot be used directly in computation of productivity index and capacity. Bottom-hole pressure can be measured directly by running a pressure gage in the well, and can be computed from fluid-level measurements and surface data.

Under equilibrium conditions, the pressure at the bottom of a well is equal to the weight of the fluid column, plus the weight of the gas in the annulus plus the pressure at the well head. This may be stated as follows:

$$Pbh = hd + Pg + Pch \qquad (9)$$

Where:

$Pbh$ = bottom-hole pressure, lb. per sq. in.
$h$ = height of fluid column, ft.
$d$ = mean column density of fluid, per ft.
$Pg$ = pressure to the gas column, lb. per sq. in.
$Pch$ = pressure at casing head, lb. per. sq. in.

The pressure at the casing head may be obtained directly by the use of suitable gages. The determination of the pressure exerted by the gas column involves the measurement of the specific gravity of the gas, which may be done with laboratory equipment.

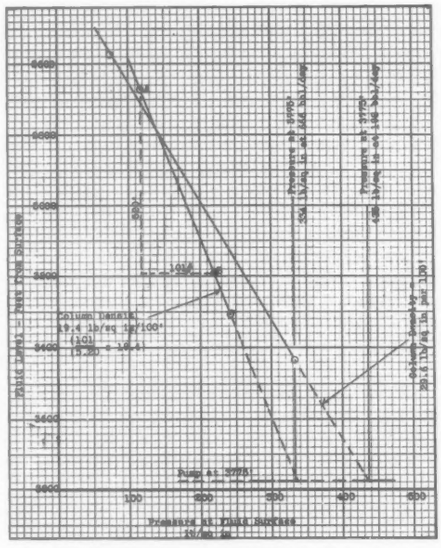

*Fig. 2—Column density and pressure determination for two operating rates well No. 11*

One service company has developed a method of determining the specific gravity from the velocity of the pressure wave used on obtaining levels. Knowing the specific gravity of the gas the pressure exerted by it may be determined from the following formula:

$$\text{Log}_{10}Pb = \frac{SD}{122.82T} + \text{Log}_{10}Pt \qquad (10)$$

Where:

$Pb$ = lb. per sq. in. absolute at bottom of gas column
$S$ = specific gravity of gas
$D$ = length of gas column
$T$ = mean temperature, °F., absolute
$Pt$ = lb. per sq. in. absolute at top of gas column.

By controlling the casing pressure, many wells can be produced without an appreciable quantity of liquid in the annulus. In such cases, the effect of the liquid column becomes negligible and bottom-hole pressure may be determined from casing pressure and gas-column pressure. Where it is impractical or inadvisable to lower the liquid level to the pump or tubing perforations, consideration must be given to column pressure of the liquid in the annulus.

The determination of the pressure exerted by the liquid column in a well involves the establishment of two or more stable fluid levels while maintaining a constant producing rate. This can be done by changing the casing pressure, either by use of a compressor or by permitting the well to build up pressure. In this manner casing pressure may be substituted for liquid pressure and, by dividing the change in casing pressure by the change in liquid level, the column density of the liquid may be determined. This density will normally be constant, if the production rate is constant, for any number of fluid levels and varying casing pressures. The total column pressure may be obtained by merely multiplying the column density by the height of the liquid above the desired datum point, which obviously must be at or above the tubing perforations. Any change in annular area may affect the column density and if there is a liner in the well a separate determination for this section may be required.

When the bottom-hole pressure has been determined at two or more stable rates of production, the well capacity may then be determined from Equations 3 and 4. (See Fig. 2.)

Potentials determined by the use of bottom-hole-pressure data have, in general, been satisfactory, although some difficulties have been encountered. Such tests usually require considerably more time than tests requiring only fluid-level measurements. When bottom-hole-pressure gages are used, it is sometimes difficult to determine when stabilization is obtained, and tests are frequently extended for some hours to assure adequate data. The use of a bottom-hole-pressure gage in pumping wells requires pulling and rerunning the pump both before and after the test, increasing the cost considerably. Also, under even the most favorable conditions, pressure gages are subject to damage from the shocks and vibration of a pumping well and occasionally tests must be repeated.

Determination of bottom-hole pressure by the back-pressure method sometimes requires a compressor to maintain the casing pressure, and a regulating valve is necessary to maintain a constant pressure when the well itself builds up considerable pressure. The fluid-level measuring equipment used for back-pressure tests is essentially the same as other tests except that the design must be suitable for high-pressure work.

Back-pressure tests require extreme care both in obtaining data and in the interpretation and analysis of results. It has been found that, in certain types of wells, conditions arising through acidizing and the attendant loading of a well will temporarily affect the normal pressure drawdown, causing the bottom-hole pressure data to reflect an erroneous index. . . .

**TABLE 1—SAMPLE DATA AND CALCULATIONS—KANSAS DRAWDOWN POTENTIAL**

**Test Data**

| | No. hr. | Depth fluid (ft.) | Production—Fluid | Production—Percent water | 24-hr. rate |
|---|---|---|---|---|---|
| First period | 3 | 944.6 | 59.03 | 1.24 | 708.4 |
| Second period | 3 | 801.3 | 49.68 | 1.24 | 596.2 |
| Third period | 3 | 607.5 | 38.75 | 1.24 | 310.0 |

**Well Data**

| | |
|---|---|
| Producing formation | Arbuckle lime |
| Well depth | 3,299 ft. |
| Producing formation depth | 3,296 ft. |
| Casing size | 7-in. |
| Casing set at | 3,296 ft. |
| Tubing size | 3-in. e.u. |
| Depth tubed | 3,297 ft. |
| Number tubing joints | 106 plus 8 ft. |
| Average joint length | 30.76 ft. |
| Depth to pump | 1,705 ft. |
| Tubing perforations | 3,282-85 ft. |

**Calculations**

P. I. (low-high rates) $= \frac{708.4 - 310}{933.6 - 607.5} = 1.221$

P. I. (low-int. rates) $= \frac{596.2 - 310}{801.3 - 607.5} = 1.476$

Average P. I. $= 1.348$

Indicated liquid capacity $= (3{,}296 - 607.5) \times 1.348 + 310 = 3{,}934$ bbl. per day.

Potential $= 3{,}000 - (0.124 \times 3{,}000) = 2{,}963$ bbl. per day.

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### Acknowledgments


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The Halliburton Oil Well Cementing Co.

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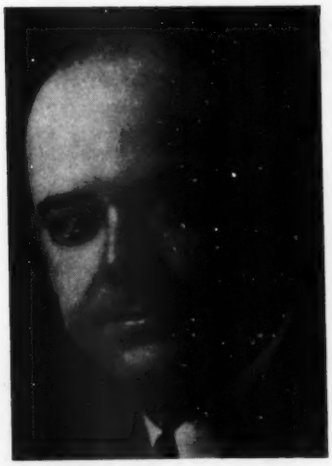

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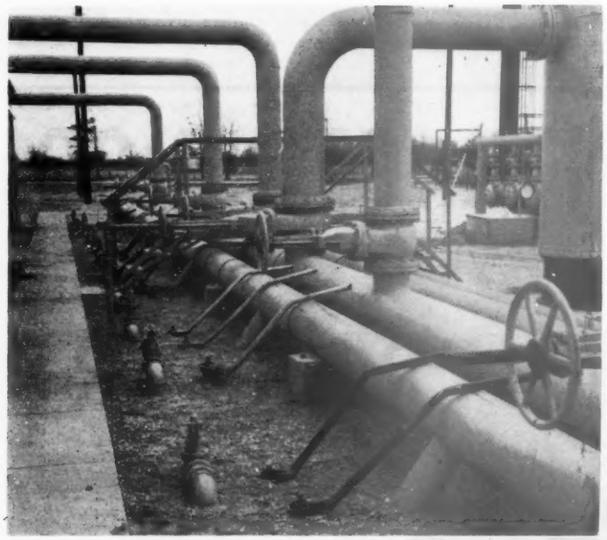
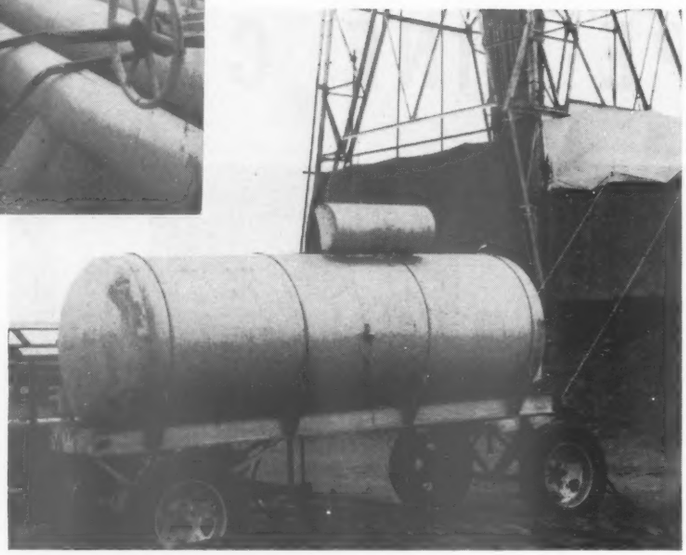
# Operating Ideas



## Handles for Wrenches

It is a simple matter to switch valves on this manifold at one of the largest repressuring and natural-gasoline plants in Illinois. Each of the valves is equipped with its own wrench which has an extension handle on it. The handles are curved so that the aboveground manifolds, to which the intake and discharge lines are connected, do not interfere with the closing or opening of the valves.

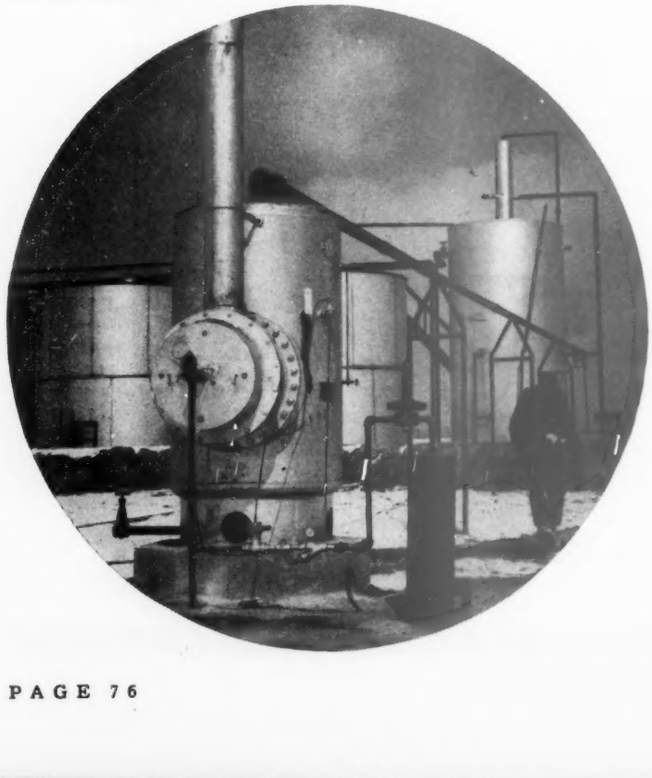


## Butane Tank Mounted on Wheels

In usual drilling operations where diesel, gasoline or butane is used as fuel for the drilling engines, the tanks containing these fuels are mounted on skids. Instead of using skids, though, one West Texas operator took an old truck frame and put new wheels on it to make a chassis for the butane tank. Thus the tank can be pulled by a truck from location to location instead of being loaded on a truck. I-beams form the frame on which the tank rests, with loops of strap steel run over the tank to hold it firmly in position.

## Supports for Treating-Unit Flow Line

Heaters for breaking emulsions are generally located at some distance from the tank battery to prevent fires. This necessitates that the line from the heater to the settling tank be run overhead. One Illinois oil company uses the modified A-frames shown in the picture instead of single pieces of pipe for supporting the flow line.



## Tiedown Prevents Roof Wind Damage

On locations where severe winds may be expected, damage and injury to personnel may result if precautions are not taken to make everything shipshape. One drilling contractor operating in exposed locations carries a bight of sand line over the roof of the shelter protecting the draw works and drilling engine, hooking one end of a turnbuckle into the bight and drawing it tight. Thus unitized, the corrugated roofing will withstand a heavy blow and the men will be protected against flying steel sheets.

# Water Flooding In Oklahoma

By L. M. ARNOLD
Geologic Standards Co., Tulsa

WATER FLOODING in Oklahoma was started in 1931 by the late Burt H. Collins on a Carter Oil Co. lease in Sections 21 and 22, Township 24n. Range 16e, Rogers County. This property now is being operated by the Whitehill Oil Corp. and is still one of the active water floods in the state. Old oil wells were utilized as producers so that it was not possible to use an equidistant well-spacing pattern, the water-input wells being placed at various distances from the producers. There were 130 acres in the project with a total of 54 water-injection wells and 54 oil wells being used. The results of this flood were not outstanding, although better than 2,000 bbl. per acre were recovered from the original 40 acres. This project did indicate, however, that the Bartlesville sand would respond favorably to a water drive.

The next to start systematic water flooding in Oklahoma was Hugh J. Walter, of Bradford, Pa., in Sections 1 and 12-25n-16e, in July 1934. During the latter part of 1935, Forest Producing Corp., a subsidiary of Forest Oil Corp., of Bradford, started work on its No. 1 flood in Section 18-26n-17e. It is understood that within a year about 3,500 bbl. per day was being produced from the quarter section under flood and that to date the recovery from this project has been well in excess of 6,000 bbl. per acre. . . .

Not only was the original water-flooding project in Oklahoma commenced in the Nowata-Rogers county district, but . . . the great majority of subsequent projects was confined to this area. It is located in the northeast part of the state and was formerly known as the Cherokee shallow district. It was of primary importance before the days of the Seminole and Oklahoma City fields. . . .

Most of the oil wells, and some of the gas wells in this area, produce from the Bartlesville sand in the Cherokee shale, which is found at depths varying from 400 to 700 ft. The formation outcrops farther to the east and is known at the surface as the Bluejacket sandstone. Above the "main pay" there are often "stray sands" which produce in places. Most of the large production is from the main pay but some pools, as the Adair and Chelsea extension, produce from the lower or second pay.

The thickness of the Bartlesville sand varies considerably and in many places it thins out or turns to shale. When productive, 15 to 35 ft. are usually present with 100 ft. being about the maximum; initial production varied with the locality but in some places amounted to 1,000 bbl.

## General

Before water flooding was started on any large scale, a number of cores was taken from the Bartlesville sand to determine its physical characteristics. . . . While values vary considerably by properties, it has been found that the better properties show average values in about the following ranges:

Permeability, 5 to 50 millidarcys.
Porosity, 18 to 22 per cent.
Oil content, 475 to 550 bbl. per acre foot.
Oil saturation, 35 to 40 per cent.
Water saturation, 25 to 35 per cent.

Various sources of water are available for flooding. These consist of river water, shallow wells, water produced with the oil, and water from the Siliceous lime. The source being utilized to the greatest extent is river water. However, because of summer shortage of water and necessity for varying treatment of the water with the different seasons of the year, there appears to be a growing tendency toward the use of Siliceous lime water. It affords an ample supply the year around and once the treatment is set up, the method may be considered stable and relatively free from the need of change. Its main disadvantage is its high degree of corrosiveness, caused by a high salt content. However, this corrosion factor is cared for by internally protecting the pipe used.

While different methods are employed to treat the water before injecting it into the sand, a typical installation using river water might be described as follows: The water is pumped from the river into a reservoir, usually earthen, although sometimes constructed of cement. From here it is picked up and discharged into treating tanks where chemicals are added to effect adequate treating. The water is next placed in a settling tank to permit precipitation of the floc. After drawing off the sludge the water is next pumped through sand filters. Backwashing of these filters, by reversing the flow of water, is necessary from time to time to remove sediment.

The water is then ready to go into the lines leading to the input wells. Some unusual methods of treatment will be discussed later in the detail description of individual projects. The flooding pattern most commonly used is the five-spot with an oil well in the center of a square formed by four water-intake wells. The distance between like wells (water to water or oil to oil) has usually been 330 ft., although a spacing of 440 ft. between like wells also has been used to some extent.

## Production Practices

Since drilling and equipping of wells is responsible for such a large part of the high initial investment required for a water-flooding project the operator is becoming more and more aware of the savings in development cost that may be effected by the use of wider well spacings. Fig. 1 (author's Fig. 4) illustrates this point. It will be seen that at a depth of 800 ft. the development cost will vary from $1,480 an acre using a 330-ft. spacing, to $520 using a 600-ft. spacing between like wells, with a cost of $920 an acre being indicated for a 440-ft. spacing.

## A.P.I.

**Water flooding in Oklahoma was started in 1931, but it was not until 1936 that any large-scale operations were begun. Out of an estimated potential water-flood area in the Nowata-Rogers district of about 50,000 acres a little over 5,000 acres have been now subjected to water flooding. These projects are in various stages of development, with recoveries to date varying from less than 1,000 to more than 6,000 bbl. per acre. The majority of the 1,850 oil wells and 2,043 water wells in this district have been drilled since water-flooding development began, with old wells being utilized only occasionally in the flooding pattern. In addition to establishing large new oil reserves, results to date indicate that many of the shallow areas of northeastern Oklahoma are adaptable to water flooding. It also seems safe to predict that this method of secondary-recovery operation will prove equally adaptable in some of the deeper productive horizons in the state. The paper was presented before the spring meeting of the Mid-Continent district of the American Petroleum Institute, Division of Production, at Amarillo, Tex., March 21-22, 1941.**

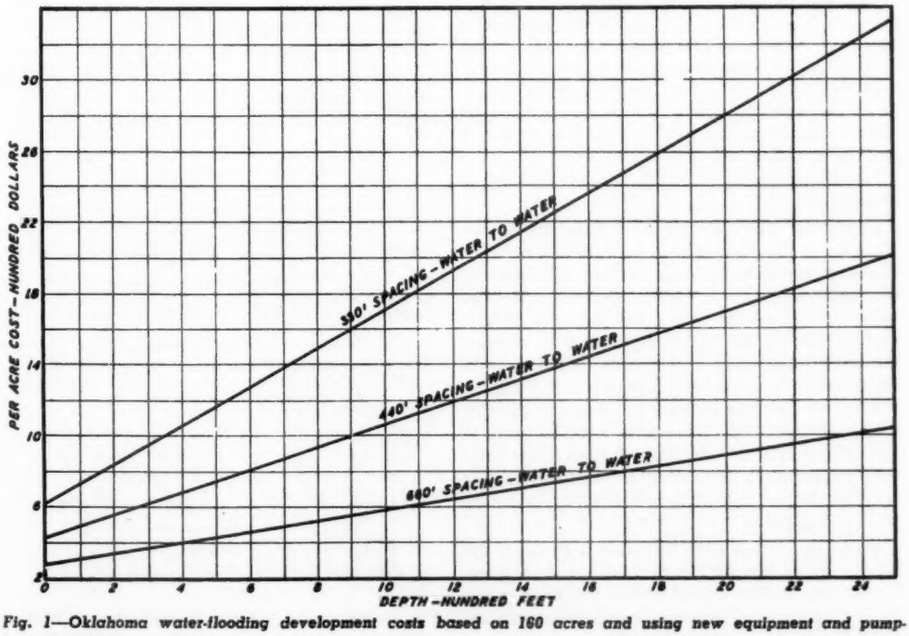



*Fig. 1—Oklahoma water-flooding development costs based on 160 acres and using new equipment and pumping oil wells*

Two methods of producing the oil are now in use and these will be discussed in order:

*Pumping.*—On properties that produce a sufficient gas supply central powers are generally used, but because this gas supply is diminishing or exhausted in a great many areas, there has been a trend of late to the use of individual pumping units. They offer a much-desired flexibility in operation in that a well may be shut down as soon as it is pumped off, thus obviating the necessity of running a central power to pump one or two wells requiring a longer pumping time than the average. Many of these units are electrically powered and are equipped with automatic switches which permit the starting and shutting down of each unit at any desired and predetermined time. Another advantage of the individual unit is its portability. For example, if a well goes on water in a section of the lease nearing depletion the unit may be transferred to another location in process of development rather than being left to pump merely for the sake of keeping a central power in balance.

*Flowing.* — This operating method consists of injecting water into the sand under sufficient pressure to cause the oil wells to flow. It is apparent that this method not only reduces the development cost but operating cost as well. It is used altogether by one of the largest operators in the field while another pumps his edge wells and flows those in the middle of his property. The chief objection of those not using the method is their belief that the higher pressures required to flow the oil wells causes a bypassing action, permitting the water to channel through the sand, thus reducing the ultimate recovery.

On the other hand, it is the opinion of the operators using this method that what bypassing does occur at higher pressures would also occur in lessened quantities at lower pressures and that the same ultimate recovery would be obtained from each method. Inasmuch as it is not uncommon for adjoining properties to be operated by the two different methods a good comparison of the merits of these methods may be expected as depletion is reached.

*Equipment.* Although the initial cost is greater, most operators use new equipment throughout the development program. Where a second-hand equipment is used, it is generally confined to oil-well tubing and some surface equipment. Since it is common field practice to pull casing after the water-well tubing has been run, packer set and string cemented, it is obvious that it is essential to use new equipment in water wells. In some cases the tubing is also cemented in oil wells and the casing pulled, but this is not a general practice and is confined to those operations where the oil wells are flowed rather than pumped.

*Pressures.* Mention has been made that operations using the flowing method must use a water-injection pressure sufficiently high to cause the oil wells to flow. Pressures used by operators pumping their wells vary according to depth and permeability of the sand. In order to determine the most satisfactory pressure to use, the operator usually increases the pump pressure gradually noting the increase in volume of water injected into the sand. When there is a sharp increase in the volume of water discharged, the critical pressure or point of bypassing is established. The operator drops the working pressure to just under this critical point.

*Shooting.*—It has been the custom to shoot the sand more or less uniformly from top to bottom, but of late serious consideration has been given to varying the shot in accordance with the permeability of the sand, as indicated by core analysis, in an effort to equalize the difference in permeability of the sand body, thus effecting a more uniform progress of the water through the sand. This procedure permits the shooting of the tighter parts of the sand with a heavier shot than the looser or more permeable sections.

*Selective plugging.* — As has been indicated above, unless corrected for, any great variation in permeability permits the water to progress through the sand in an uneven front; thus sections of the sand flood out more quickly than others, with the result that the recoverable oil from these more-permeable sections will be produced first, at which time these sections will produce nothing but water. In order to reduce the amount of water that passes through these more permeable sections while flooding out the oil from the tighter streaks, it is desirable that the operator plug or seal off the flooded-out section.

If the loose or more permeable section is at the top of the sand, the operator's problem is relatively simple for it has been found that wax distillate injected into the input well will float on the water to the upper part of the sand body and form a fairly efficient seal. This procedure is repeated as often as necessary. Cement and other materials have also been used as a plugging agent. If, however, the loose section occurs in the middle of the sand, a far greater problem is presented and one that has not as yet been completely solved. Consideration has been given to the use of air or gas slugs injected intermittently, based on the Jamin theory, but sufficient field experience has not been obtained to judge the merits of this procedure.

(The author presented general data on 29 individual floods under way in Oklahoma, which are not included here.)

## Conclusion

Fig. 2 shows the average relationship in barrels per day produced by water flooding in the northeastern stripper area to total oil produced in that area. It indicates that of the total oil produced from March 1938 through June 1940, a minimum of 36.5 per cent to a maximum of 43.8 per cent came from properties being water flooded. Probably no statement could be made that would be more significant of the benefits derived from this method of operation. Properties that a few years ago were considered to be scarcely worth pumping have been proven to have large reserves of oil recoverable by water flooding. Table 1 indicates that approximately 8,500,000 bbl. of oil have already been recovered by water flooding from these properties through June 1940, the greater part of which would still be in the ground had not this method been employed.

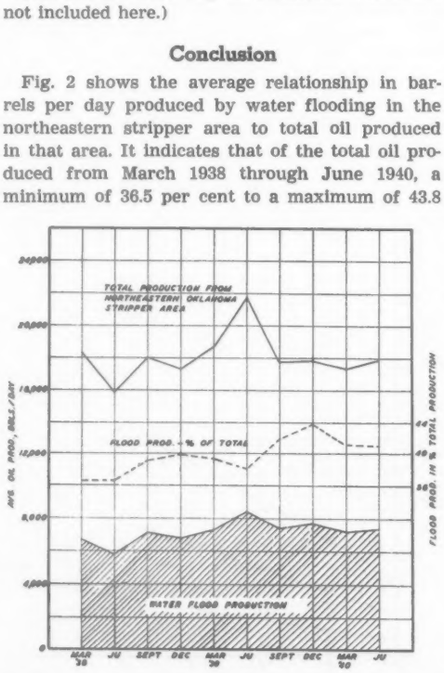



*Fig. 2—Relation of water-flood production to total oil production in northeastern Oklahoma stripper area*

TABLE 1—OIL-PRODUCTION RECORD FROM WATER-FLOOD AREA, NORTHEASTERN OKLAHOMA

Figures as of July 1940

| Area— | Acres under flood | Cumulative oil | Cumulative water | Number of oil wells | Number of water wells |
|---|---|---|---|---|---|
| No. 1 | 4,932 | 8,370,028 | 99,462,792 | 1,850 | 2,043 |
| No. 2 | 160 | 11,634 | 54,542 | 8 | 2 |
| No. 3 | 30 | 51,189 | 449,495 | 8 | 12 |
| No. 4 | 40 | 41,722 | 882,325 | 19 | 25 |
| No. 5 | 30 | 24,485 | 79,600 | 11 | 1 |
| Total | 5,192 | 8,499,058 | 100,928,754 | 1,896 | 2,083 |

In studying the data shown in Table 1, consideration should be given to the fact that the acreage under flood is in various stages of development. Because of this, the total oil when reduced to a per-acre figure is misleading. This is easily explained by the following illustration using a theoretical water-flood project comprising 80 acres: In 1937, 40 acres were fully developed and have produced a total of 160,000 bbl. of oil from that date until July 1, 1940. The second 40 acres were not developed until late in 1939 and during the early part of 1940, and produced a total of 8,000 bbl. of oil to July 1, 1940. So on that date there were a full 80 acres under development with a total oil recovery from the 80 acres of 168,000 bbl. When reduced to a per-acre basis, the recovery shows 2,100 bbl. per acre, while actually the first 40 acres recovered 4,000 bbl. per acre and the second 40 acres had just started to come on production and showed a recovery of only 200 bbl. per acre.

With this thought in mind the data for Area 1 in Table 1 may be summarized as follows:

| | |
|---|---|
| Cumulative oil produced per acre, bbl. | 1,697 |
| Cumulative water injected per acre, bbl. | 20,167 |
| Cumulative oil produced per well, bbl. | 4,524 |
| Cumulative water injected per well, bbl. | 28,685 |
| Average water-oil ratio | 12 to 1 |

It is estimated that not more than 10 per cent of the total productive average in the Nowata-Rogers district is now under water-flood development. With from 36 per cent to 44 per cent of the total production in this area coming from only 10 per cent of the prospective water-flood acreage, the future for this area appears very encouraging. While the fact must not be overlooked that there have been instances of failures in water-flooding projects in Oklahoma, resulting in abandonment of operations, yet it has been proven that with proper preliminary investigation such failures can be pretty well eliminated.

There is little question but that investigation will prove other areas of Oklahoma to be adaptable to this secondary-recovery method with the problem of flooding deeper sands being solved by the use of a wider well spacing, and in a pattern which would permit the operator to continue to use the oil wells already present as producers, thus eliminating almost altogether the expense of drilling new producing wells.

## Acknowledgment

The writer wishes to express his appreciation to D. M. Logan of the Oklahoma Corporation Commission for information supplied by him; and to D. M. Koons for his aid in preparation of graphs.

# Digests of A. P. I. Papers

**Presented before the Mid-Continent district, Division of Production, at its spring meeting in Amarillo, Tex., March 21-22, 1941**

## Oil-Well Cementing Practice in Kansas

GEORGE T. HOISINGTON (Halliburton Oil Well Cementing Co.)

FIRST cementing jobs in Kansas were for water shutoff. Then came specialized jobs to correct mechanical difficulties. About this time the practice of completing a well in a second producing zone began and cement was used to protect the upper zone.

Domestic water will be gradually depleted through migration into lower permeable zones unless a permanent shutoff is had on the surface casing. In areas where there is artesian water in the Comanchean sands, the domestic water will be contaminated by the salt-water flow unless it is sealed off. Complete protection is obtained by cementing the surface pipe to the surface.

West of Range 15w lost circulation may be expected; difficulty is often had east of this line and it may be encountered in the chat where Mississippian is present and in other zones in local areas. If drilling is continued after lost circulation is encountered without permanently sealing the zone in which the returns are lost, trouble will be had when casing is run and an attempt is made to place the cement above that formation.

Completion of wells without regard to this fact has caused irreparable damage to upper producing horizons. Damage to casing is evidenced in one area by the fact that the pipe above the chat section is recovered.

In some cases in these wells return of the cement to the surface was obtained, but immediately the pump was shut down, fluid would start dropping in the hole outside the casing and continued until it had reached static fluid level in the area. Cotton-seed hulls in large quantities were used and circulation maintained while drilling, but the scouring action of the cement behind the casing would break up and remove the plugging material and reopen the formation. The weight of the cement slurry was reduced by the addition of bentonitic gel with beneficial results, although many operators were skeptical.

Experience is indicating that it would be well to consider a change in the drilling mud used in areas where lost circulation occurs. There are a few formations that will not support a hole full of clear water while drilling to a desired total depth with only the help the bit gives in sealing off the formation. When loss of returns is encountered, then seal off the troublesome zone with cement or any other material which gives a permanent job.

The author then compares several wells with one which used a light drilling fluid and ran 17 spot balance cement jobs to seal off their formations. The well using this method was successfully completed, while other wells failed to reach their objective.

In some areas, particularly in Clark County, complete loss of returns may be experienced in the Upper Cretaceous, where what is indicated to be an underground stream is encountered.

Recent practice of setting casing through producing sections and completing by perforation across the face of the saturated zones, many but a few feet apart and some having water between them, is causing some to attribute cementing failures to insecure bond between the cement and the wall of the hole. There is much evidence that many of these failures could have been avoided by a device to center the casing in the well bore. The writer does not believe that mud cakes are of a thickness or composition to survive the scouring action of cement being placed.

●

## Secondary-Recovery Methods in Rocky Mountain Region

CLARK F. BARB (Professor, Colorado School of Mines, Golden, Colo.)

THERE are 115 known oil fields in the Rocky Mountain region, which covers northern New Mexico, Colorado, Utah, Wyoming and Montana. Within this area there has been relatively little secondary-recovery work. There has been no attempt at water flooding and only one air drive is in operation. There are several gas-repressuring or pressure-maintenance projects and these are specifically mentioned. The paper also includes a map with an index of the producing fields.

**Lance Creek, Wyoming.**

The field covers 2,465 productive acres in the basal Sundance series at an average depth of 3,875 ft. Pay thickness is about 90 ft., porosity is 20-25 per cent, average permeability is 410 millidarcys. There are 62 oil wells, no gas wells and one dry hole; control is volumetric. Estimated recovery natural was 23,000 bbl. per acre. Gas injection started in February 1938 through nine input wells at 900 lb. per sq. in. A 2,100-hp. plant delivers 10,000,000 cu. ft. daily. Forty-six producing wells now make 6,625 bbl. per day and nine wells are shut in because of excessive gas-oil ratio. Approximately 1,715 acres of this sand are affected; original bottom-hole pressure was 1,550 lb., estimated.

Prior to 1938 the pressure decline was 1 lb. per 10,000 bbl. oil produced and in July pressure decline was 1 lb. per 143,000 bbl. produced. At start of repressuring, the bottom-hole pressure was 810 lb. and is now 830 lb. A fault separates the unit area from the east area and this section has not benefited by the gas injection. In August 1940 the east area started repressuring.

Field also has production from 4,730 acres of Leo sand at 5,400 to 5,380 ft., pay 15 to 140 ft. thick, porosity 15 per cent average, permeability varies from 0.1 to 478 millidarcys, with the average between 20 and 30 millidarcys. No secondary methods have been widely used in this formation, although one well has been taking about 800,000 cu. ft. daily. Plans are to return 1,000,000 cu. ft. daily to the Leo, beginning this year. Intend holding Sundance bottom-hole pressure at its present level and use excess gas for Leo.

**Fort Collins, Colorado.**

Produces from 480 acres of Muddy and Dakota sands at about 4,500 ft. Continental Oil Co. owns the field with 15 oil wells, no gas wells and 2 dry holes. Natural recovery 4,500 bbl. per acre. Field being repressured through two wells at 275 lb. per sq. in. Plant is 100-hp. capacity. Oil production is 150 bbl. daily from eight wells, with 47,000 cu. ft. being recycled. Project is handicapped by excessive channeling. No estimate has been made of the probable recovery.

**Rattlesnake, New Mexico.**

Field produces from 570 acres in the Dakota sand of about 200 ft. in thickness at a depth of 800 ft. Anticlinal structure with hydraulic control. There are 81 oil wells, no gas wells and 28 dry holes and natural recovery to October 7, 1940, was 7,000 bbl. per acre. Started gas repressuring in 1930 with a 150-hp. plant delivering 100,000 cu. ft. daily at a pressure of 275-400 lb. per sq. in. Approximately 160 acres affected with production of 350 bbl. daily. Lenticular nature of sand has prevented effective repressuring and project is more of a gas-conservation measure.

**Cat Creek, Montana.**

Field produces from about 750 acres of first and second Kootenai sands at a depth of 1,160 to 1,500 ft. Pay averages 25 ft. in thickness. Structure is large anticline with hydraulic control. There are 192 oil wells, no gas wells and 33 dry holes. Natural recovery about 18,896 bbl. per acre. Repressuring with air started in October 1934 and 93 wells are producing with 11 input wells. Plant is 165-hp. capacity and delivers 209,000 cu. ft. at 215 lb. per sq. in. Well spacing is about 440 ft. and from 920,000 to 7,000,000 cu. ft. required to establish cycle. Repressuring affects 350 acres and production is 435 bbl. daily. Total recovery to date is 14,708,345 bbl. of 50-gravity crude, of which 715 bbl. per acre is due to repressuring. The field is badly faulted and it is difficult to work out a uniform well pattern.

**Rock Creek, Wyoming.**

No figures are available on the project owned by Ohio Oil Co., but it is understood to have produced beneficial results. Gas is used for repressuring.

**La Barge, Wyoming.**

Production is found in sand lenses in Wasatch formation at depths of 800 to 1,100 ft. Structure is an assymetrical anticline. Approximately 600 acres are now productive with total potential acreage about 930. Recovery to date is about 11,000 bbl. per acre. Present daily production is about 1,400 bbl. To date there are 130 oil wells, 12 gas wells and 29 dry holes on an average spacing of 440 ft. Gas injection started by Texas Co. in 1932 with a 90-hp. plant at the rate of 2,000 to 80,000 cu. ft. per day at 220 lb. per sq. in. Proration started at the same time and effects of repressuring could not be judged immediately. Present estimates are repressuring has raised production 30 per cent.

**Salt Creek, Wyoming.**

About 22,000 productive acres in the field with the major producing sands the first, second and

third Wall Creek sands. Depths range from 900 to 1,700 ft. Some production in deeper sands, but nothing like the upper ones. Midwest Oil Co. started pressure drive in second Wall Creek about 1925. Discharge gas from gasoline plant was used and production increase encouraged expansion of the project to include entire field. Pressures are 230 to 275 lb. per sq. in. The first Wall Creek was found to be too tight to respond to similar treatment.

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## Repressuring in Kansas

**L. L. McWILLIAMS (Phillips Petroleum Co.)**

REPRESSURING in Kansas is practiced exclusively in the sand areas of the southern part of the state. In the extreme east are the earlier-developed shallow-sand pools. Records on these old pools are usually poor and of small value. Further to the west are the deeper Bartlesville "shoestring sand" pools. The repressure data on the projects in these pools are excellent.

The shoestring-sand pools are the gas-expansion type and occur in the Cherokee shale of Pennsylvanian age. These sand bodies are lens-shaped and elongated and range in width from ½ to 1½ miles and in length from 1 to 7 miles. The regional trend in depth of these pools increases as they progress westward, varying between 1,500 and 3,200 ft.

The best pay is usually found in the center of the pools and toward the edges the sand usually thins and grades into shale. Sand thickness varies from 50 to 100 ft., but stringers of sandy shale make up a portion of this. Meager core data indicate a porosity of about 18 per cent. Areas which had the best initial production and oil recovery respond best to repressuring.

Some operators use a wide spacing and the injection of a large volume of gas with distribution over the field being controlled by back pressure. Other operators use more input wells and lesser volumes of injected gas per well. Some put the input wells on the edge in the poorer part of the pay and drive toward the more permeable sections in the center. Some use a drilled well to make a five-spot pattern, but most operators convert a producing well. Ratio of input to producing wells varies from 1 : 3 to 1 : 7.

Injection pressures and volumes vary in individual pools. Pressures from 20 to 550 lb. are used; higher pressures are used in poorer parts of a pool. Input volumes vary from 10,000 to 300,000 cu. ft. per well per day.

In the early life of the repressure projects, the gas-oil ratio and the volume of produced gas is usually small but increases thereafter. The cost of gathering and recycling small volumes of produced gas exceeds in some cases the cost of purchasing a like volume of makeup gas. Investments in a gas-gathering system have been forestalled in some cases by purchasing gas.

The Madison repressure project has 980 acres and was started 9 years ago. Increased recovery is estimated at 930,000 bbl., or 16 per cent of total recovery to date. Repressuring caused increase in production for 4 years, after which production declined. Oil production at peak was 2.3 times what it would have been without repressuring and is now 2.1 times greater.

DeMalorie-Sowder project has 750 acres. Experimental repressuring started in 1935 and stepped up in 1938 following unitization. Oil production increased 299,000 bbl. by 3 years intensified repressuring. In 1940 production was 2.8 times over what it would have been without repressuring and is still increasing. Operators voluntarily held oil production constant for a year and until a pressure of 12 lb. was developed on casing heads. Produced gas-oil ratio has increased from 950 to 1,400 cu. ft. per bbl.

Unitization within individual pools has facilitated repressuring. Operators generally are agreeable to unitizing properties on a basis of past production, producing wells and current oil production. Unitization offers the cheapest repressure costs in addition to the most flexible program for input-well spacing and input volumes.

An interesting development is the injection of small volumes of water with the input gas, the object being to reduce the movement of gas through the more permeable streaks in the sand. This is still an experiment, but it has reduced the gas-oil ratio in one case and in another has increased the production.

The paper also includes a map of the area and tables and graphs showing the operating data on nine repressuring projects.

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## Mud Control as an Aid in Mid-Continent Drilling

**E. R. ALBERT, JR. (Baroid Sales Division, National Lead Co.)**

GENERALLY speaking, mud control in the Mid-Continent area is a problem which grows out of its economic importance rather than from its mechanical difficulties.

Both operator and contractor are becoming aware of the fact that through simple treatment and small expenditures on mud control, they are able to realize large savings in rig time and money.

Primary functions of a drilling mud are to lubricate the bit, seal the wall of the hole, prevent caving and water loss into the formation, deposit a thin, impervious cake on the wall, maintain the maximum annular space, remove cuttings from the hole and deposit them in the pits, hold the cuttings in suspension while circulation is stopped, and to supply a hydrostatic head sufficient to confine gas, oil or water to their respective formations.

Perhaps the most important single characteristic of a good drilling fluid is its ability to build a thin impervious filter cake on the walls of the hole with a minimum water loss. It is extremely important that correct particle-size distribution of both inert solids and colloidal materials be present in the drilling mud to give the desired filtration characteristics. It has been found that the amount of water filtered from the mud is proportional to the colloidal content and the resultant cake thickness.

Maintaining the proper wall-building and water-loss properties will eliminate much of the trouble from stuck pipe, make it easier to run electrical-logging devices and casing into a well, eliminate troublesome caving of shales, and reduce the amount of weighting material required in some cases.

Viscosity and gel strength should be kept as low as possible but the gel strength should be kept sufficiently high to prevent cuttings from settling when circulation is interrupted. A high viscosity retards drilling rates. The percentage of inert solids should be kept at a minimum so that a maximum of colloidal material may be used. By regulating the amount of water into the pits in relation to formation and speed of drilling, and with small and frequent additions of colloidal material, the viscosity and gel strength of a Mid-Continent mud is easily controlled.

A small amount of weighting material should be used to raise the weight from say 10.2 to 10.7 lb. per gallon rather than to increase the inert solid content by withholding water from the pits.

Weighting material and time are saved by starting with a drilling fluid of low-specific-gravity solids and building up the required weight difference with high-specific-gravity weighting material so that complete control and flexibility of the mud may be realized at all times.

Considerable trouble can be avoided while drilling a gas zone by reducing the rate of penetration and raising volume of mud passing the bit.

Mud contaminated by salt, gypsum, anhydrite and cement loses its viscosity, gel properties and will show a settling of the agglomerated mud particles. A flocculated mud has very poor wall-building properties and is dangerous to use. There are a number of deflocculating agents available.

A natural, uncontaminated Mid-Continent mud will have a pH range of approximately 7.5 to 8.5. In chemically treating and controlling drilling fluids in this area it is well to arrive at this pH range.

A new type of treatment is now available whereby the water loss of a salty mud may be lowered to as low as 4 cc. even when the mud is saturated with salt. This treatment can be accomplished by the addition of from 3 to 5 lb. per barrel of a salt-resisting colloid (depending on the water loss desired). Salt water does not affect this new colloid which acts very much the same as other colloidal materials do in fresh-water muds. This new treatment points to an elimination of many of the drilling difficulties of West Texas and New Mexico with a saving in time and money.

If the pay section is to be drilled with mud, the filter characteristics of that mud should be low enough to prevent appreciable damage to the formation. Likewise it follows that if several possible pays are encountered before reaching the prospective total depth, these too should be protected with a low-water-loss mud.

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## Water Flooding in Kansas Through July 31, 1940

**R. C. EARLOUGHER (Geologic Standards Co.)**

IN the past few years there has been considerable interest and activity in water-flooding investigations and developments in shallow stripper area of Kansas. As this area lies for the most part in the eastern section of the state, the greatest activity in secondary recovery by water flooding has been and still is in the counties of Neosho, Allen, Bourbon, Linn, Anderson, Crawford, Wilson, Chautauqua, Montgomery and Greenwood. With the exception of the floods in two of the counties named, all of the floods are operating on relatively shallow sands varying in depth from 250 ft. in Crawford County to 900 ft. in Allen and Neosho counties. In Chautauqua and Greenwood counties floods are operating at depths of 1,100 to 1,950 ft.

First flooding in the area consisted of pulling or perforating the casing, thus letting water from near the surface flow into the sand by gravity. Later, salt water produced with the oil was put

into the flood wells. This erratic method is still in use. Water flooding in general and on a planned development basis was commenced in September 1935.

In March 1938, the total oil produced from the shallow stripper area was 212,000 bbl. with production by flooding amounting to 28,200 bbl. or 13.3 per cent. In June 1940, total production was 236,000 bbl. with 67,700 bbl., or 28.7 per cent, representing the results of flooding. This 28.7 per cent was obtained from about 3 per cent of the total acreage involved. Total flood production to the end of 1938 was 600,000 bbl. and to July 1, 1940, it was 1,249,000 bbl.

General geology of the area is discussed and a description of the different producing sands is given in the paper. Principal sand being flooded is the Bartlesville with others being the Wayside, Peru, Squirrel, and New Albany. A large number of cores have been taken in the area and much information is available concerning the producing sands.

**Flooding water.**

Surface water from ponds and streams is the most common source of flood water now although many operators are looking to the salt water in the siliceous lime as the chief future source of water. Almost an inexhaustible source of water is required. In the month of June 1940, nearly 513,000 bbl. of water were injected. This is an average of 17,000 bbl. per day or 17 bbl. per day per acre. The overall ratio of water to oil is 10 to 1. The ratio varies from 2.5 to 1 to as much as 25 to 1. Cumulative water input to July 31, 1940, was approximately 16,400,000 bbl.

**Development.**

Nearly all of the floods use the five-spot method. Some operators are drilling new wells but mostly old wells are employed. New oil wells are equipped with 6-in. to the top of the sand which is cemented to the top. Water wells use 1½ or 2-in. tubing with a swedge nipple packer reinforced by about 10 sacks of cement. Most common spacing is 330 by 330 ft. Some are going to slightly wider spacing depending on the sand conditions. One flood, using 660 by 660 ft. on part of the tract, has shown that even such a wide spacing may be practicable in certain cases.

**Operating practice.**

Out of 395 oil wells on flood projects, 295 are old wells. Most of the wells are pumped with central powers although some operators are flowing their wells and one large operator is using individual electrically driven units. Most operators maintain pump pressures from 500 to 700 lb. per sq. in. and then throttle the flow at the individual input wells. When injection is first started the input wells are pinched and gradually increased to hold a constant rate of input.

**Prevention of bypassing.**

Various methods have been tried to find a selective plugging agent. Loss through the top of the sand can be cut down by cementing. Some operators use selective shooting to correct variations in permeability in the lower section. Cement slurry injected into the wells by one operator has been found helpful and Aquagel has also been used to cut down the bypassing.

**Oil recovery.**

While none of the floods in eastern Kansas have been carried to completion, the results thus far indicate good ultimate recoveries. One project flooding only about 20 ft. of sand already has recovered about 2,300 bbl. of oil per acre. Other floods have recovered from 1,000 to 4,000 bbl. per acre. It is estimated that 200,000,000 bbl. of oil probably will be produced in the area as a result of flooding.

## Care and Maintenance Of Diesel Engines

**T. M. FAHNESTOCK (Caterpillar Tractor Co.)**

THE design of diesel engines used in drill rigs and oil-pumping stations differs from that of the large slow-speed types and it has been necessary to change our ideas with regard to the care and maintenance in order to secure the maximum performance.

The major factors contributing to low operating costs are: (1) Installation, (2) lubrication, (3) fuels, (4) maintenance, and (5) operating personnel.

**Installation.**

There are factors in installations which have a marked influence on maintenance costs. There are two types of installations, (1) mobile units such as drilling rigs and (2) permanent installations such as pipe-line stations and diesel-powered generating sets for pumping leases.

Engines which are to be compounded should not be located so close together that they will interfere with checking the crankcase oil, draining and refilling the crankcase and servicing the fuel and lubricating-oil filters and the air filter.

**Stationary units.**

A number of items must be considered on stationary units. Where a new building is being erected the following are important: (1) Foundation, (2) piping, (3) cooling system, (4) exhaust system, and (5) safety guards.

Mounting the engines above the floor makes crankcase drainage and bearing inspection easier. Vibration dampers are available where necessary. Sliding rails for engines mounted on steel bases provide an easy method of belt adjustment and covered trenches in the floor are suitable for piping. If the engine is on sliding rails, flexible connections will be needed.

**Cooling systems.**

Cooling systems employing a fan and radiator are less expensive to install but require more horsepower than a circulating pump in a heat exchanger. Adequate room ventilation must be provided even when large-capacity radiators are used. Provision needs to be made in some localities for preventing the clogging of the radiator.

Heat exchangers require a larger initial investment because of the cost of the piping; an adequate supply of water is also necessary. Provisions must be made in cold climates against freezing. Piping should be designed to prevent air pockets. In some cases engine-jacket water and water for the engine oil cooler is cooled by means of pipe-line heat exchangers using crude oil as a cooling medium.

Vertical exhaust pipe should be covered to prevent entry of rain and snow and should have an offset with a drain to prevent water from running down the stack while the engine is idle. Horizontal exhaust pipes should slope away from the engine. Flexible couplings between the engine and the exhaust manifolds will reduce the number of gasket failures; exhausts of two engines should never be coupled together.

**Lubrication.**

Compounded lubricating oils for high-speed diesels were found to give the most satisfactory service under various operating conditions. Investigation along this line has just started and continued improvements may be expected. As more stable oils are developed the drain periods may be extended. Straight mineral lubricating oils are recommended for use in the starting engine crankcases, fuel-injection pump housings and air cleaners.

**Fuels.**

At the present time satisfactory fuels can be obtained almost anywhere. Premature failure of injection equipment has been eliminated by an instruction campaign on fuel handling. Fuel storage tanks set at a slight angle will allow impurities and water to settle out and be drawn off. Absorbent-type filters are now being used which remove the finest abrasive material from the fuel. Crude oil has been used as a fuel but it must be allowed to settle for a longer time than distillate. Dual storage tanks are necessary and the crude oil is allowed to settle for 48 to 72 hours. The bottom fourth of the tank is returned to the pipe line because of large quantity of impurities it contains. Extra large filters are necessary and where the viscosity is high, heat exchangers may be employed.

**Maintenance.**

Maintenance includes daily care of the engines, servicing, periodic adjustments, general inspection, cleaning, painting and rebuilding of the engine at intervals. Regular servicing includes daily check of crankcase, changing the crankcase lubricating oil, servicing lubricating oil, fuel oil and air cleaners.

Fuel-injection systems without provision for adjustment should give the best service as this is a critical adjustment anti can only be made with the proper equipment. Fuel-injection pumps generally show the same wear but it should be possible to replace either individual pump or valves.

**Records.**

Unless adequate records are kept, a company cannot be accurately informed as to the actual cost of operation and cost of maintenance per unit of work produced. A set of forms used by one pipe-line company operating in Illinois includes: (1) Daily report on pump and motor, (2) maintenance record, (3) fuel-consumption record, (4) lubricating-oil-consumption record, and (5) repair record.

The daily report contains running time, down time, lubricating-oil filter change, fuel-oil filter change, record of lubricating oil added between changes and oil consumption in hours per quart, nature of repairs and date of last similar repair and the station output. The maintenance record of each unit provides the following information: Lubricating-oil and filter changes, fuel filter changes, starting engine crankcase-oil change, radiator service.

**Parts replacements.**

Properly installed diesel engines, installed under recommended conditions, should run from 6,000 to 10,000 hours before reconditioning. Large companies invariably overhaul their engines more completely than is actually required. This is done to supply "reliability insurance." A liner wear of about 0.001 in. per 1,000 hours is generally acceptable and liners are generally being used until the wear has reached approximately 0.003 in. per inch of diameter. Water pump, lubricating-oil pump, fuel-injection system should be cleaned, inspected and overhauled if necessary at the time of reconditioning.

**Personnel.**

Operators should adhere to the service schedules and in addition should be able to recognize unusual conditions so service interruptions can be avoided. Capable mechanics should be used to repair the engines and they should be able to tell by examination whether parts should be replaced or continued in use. Sometimes this is difficult to do and it is far better to install a few more parts than it is to risk a service interruption.

# METALS in REFINING

By W. L. NELSON

## Composition and Resistance to Scaling of Pipe-Still Tubes

**This and about 12 articles which will comprise a series of articles under the general heading of Metals in Refining are a continuation of the series of articles published in 1939 and 1940 on the use of metals in drilling and in production.**

**The present series of articles on refining is part of a general program in which it is hoped that the use of metals in all phases of the petroleum industry can be discussed. In 1939 and 1940 the drilling and production branches of the industry were discussed; in the present series the refining and natural-gasoline branches are discussed; and finally the use of metals in the transportation and pipe-line end of the petroleum industry will be discussed in the future. Numerous references will be given so that a comprehensive bibliography will be available.**

**The recommendations given in these articles are those of metal-product manufacturers as published in the literature, rather than those of the editorial staff of The Oil and Gas Journal.**

FOR conditions which do not involve corrosion by sulfur, the two properties which a tube steel must possess are strength at elevated temperatures and resistance to oxidation (rusting) by the furnace atmosphere. Table 1 indicates the general composition, strength, oxidation resistance, and cost of the common tube steels. Molybdenum and to a lesser degree silicon have been found to be influential in increasing the high-temperature strength. A larger amount of molybdenum than 1 per cent does not materially increase the strength[8] and the use of more than about 1.5 per cent of silicon creates fabrication difficulties. Likewise, chromium, silicon, and aluminum[2] have been found to be useful in suppressing oxidation. Silicon or aluminum are seldom used alone, however, and probably they must be used with chromium in order to take full advantage of the benefits which they bestow. Silicon is thought to be about seven times as effective[10] as chromium in suppressing oxidation, and aluminum, four times.

The only other element that is commonly employed is nickel and its purpose is a purely indirect one because nickel increases neither the strength nor the oxidation resistance. Nickel is used in the steels of high chromium content to stabilize the carbides in these steels so that they do not become brittle during long heating in the pipe still. Titanium or columbium are used in small amounts in high-chromium steels that must be welded and which cannot be properly annealed after welding. Without these elements the carbides in high-chromium steels tend to precipitate and accumulate at the boundaries of the grains of metal, which results in extreme embrittlement.

It will be noted in Table 1 that oxidation (rusting) is the limiting factor in the use of most of the steels which contain less than 5 per cent chromium. Some of these steels exhibit good strength, notably the first five steels, but in every instance oxidation begins to take place at a relatively low temperature. At a higher chromium content than 5 per cent, the reverse situation exists. The high-chromium steels exhibit a good resistance to oxidation but the strength does not increase proportionally. For these reasons the temperature at which the low-chromium steels (less than 7 per cent) should be used is dependent on oxidation resistance, whereas the upper temperature limit for the use of high-chromium steels is governed by the strength.

The use of low-alloy content steels is always justified by a simple consideration of cost and strength[9] but if the chromium content exceeds about 3 per cent the high cost of the steel requires that it must exhibit oxidation (and corrosion) resistance as well as strength, in order to justify the cost of the alloy steel. In most instances when all factors are considered (strength, oxidation resistance and corrosion), the cost of maintaining alloy steels in a cracking-plant pipe still is always less than the cost of maintaining plain carbon-steel tubes.[10] In many instances the cost of maintaining alloy-steel tubes is only one-fourth as much as the cost of maintaining carbon-steel tubes. The same is usually true even for regular low-temperature pipe stills.

Finally, certain very high-temperature operations such as reforming, polymerization, hydrogenation, alkylation, etc., cannot be conducted at low temperatures and hence tube steels which contain more than 5 per cent of chromium must be employed. Hydrogen tends to attack plain carbon steels[11] and therefore steels containing 3 or more per cent of chromium or containing tungsten, molybdenum or vanadium are employed.

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**TABLE 1—COMPOSITION, STRENGTH, OXIDATION RESISTANCE, AND COST OF PIPE-STILL TUBE MATERIALS**

| | Approximate composition* | | | | | Approx. max. working temp., °F. | Creep strength 1% in 10,000 hrs. | | Approx. relative cost | Scaling† temp., °F. | References |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Chromium per cent | Molybdenum per cent | Silicon per cent | Carbon per cent | Others per cent | | At working temp. | At 1,000 °F. | | | |
| Low carbon | ... | | 0.25 max. | 0.15 | .... | 900 | 11,000 | 6,000 | 1.0 | 1,000 | 1, 4, 5 |
| Carbon moly | ... | 0.5 | 0.25 max. | 0.15 | .... | 1,000 | 12,000 | 12,000 | 1.47 | 1,000 | 1, 4, 5 |
| Carbon high moly | ... | 1.0 | 0.25 max. | 0.15 | .... | 1,000 | 11,000 | 11,000 | ... | 1,000 | 1, 5, |
| Silicon moly | ... | 0.5 | 1.40 | 0.15 max. | .... | 1,000 | 9,500 | 9,500 | 1.51 | 1,050 | 1, 6 |
| 1 Chrome moly silicon | 1.25 | 0.5 | 0.75 | 0.15 max. | .... | 1,150 | 5,000 | 20,000 | 1.92 | 1,050 | 1, 4 |
| 1 Chrome moly silicon | 1.0 | 0.5 | 1.25 | ... | .... | 1,150 | .... | .... | ... | .... | 1 |
| 2 Chrome moly silicon | 1.75 | 0.7 | 0.65 | 0.15 max. | .... | 1,150 | 4,500 | 12,000 | ... | 1,050 | 1 |
| 2 Chrome moly | 2.0 | 0.5 | 0.50 max. | 0.15 max. | .... | 1,200 | 3,000 | 9,000 | 2.13 | 1,000 | 1, 3, 4, 5 |
| 2 Chrome moly silicon | 2.0 | 0.5 | 1.20 | 0.15 max. | .... | 1,200 | 3,500 | 7,500 | 2.21 | 1,050 | 1, 3, 4 |
| 2 Chrome moly silicon | 2.5 | 0.5 | 0.75 | 0.15 max. | .... | 1,200 | 2,500 | 9,000 | 2.33 | 1,050 | 1, 3 |
| 2 Chrome high moly | 2.25 | 1.0 | 0.50 max. | 0.15 max. | .... | 1,200 | 4,500 | 12,000 | 2.41 | 1,000 | 1, 3, 4 |
| 3 Chrome high moly | 3.0 | 0.9 | 0.50 max. | 0.15 max. | .... | 1,200 | .... | 10,000 | 2.60 | 1,050 | 1, 3, 5 |
| 3 Chrome moly silicon | 3.0 | 0.5 | 1.20 | 0.15 max. | .... | 1,200 | 3,500 | 8,500 | 2.54 | 1,100 | 1, 3, 4 |
| 5 Chrome moly | 5.0 | 0.5 | 0.50 max. | 0.15 max. | .... | 1,200 | 2,600 | 9,500 | 3.30 | 1,100 | 1, 3, 4, 5 |
| 5 Chrome moly silicon | 5.0 | 0.5 | 1.50 | 0.15 max. | .... | 1,300 | 1,500 | 9,000 | 3.48 | 1,500 | 1, 3, 4 |
| 5 Chrome moly silicon | 5.0 | 1.0 | 0.75 | 0.15 max. | .... | 1,300 | 1,800 | .... | 3.53 | 1,250 | 4 |
| 5 Chrome moly silicon aluminum | 5.0 | 0.5 | 0.75 | 0.15 max. | 0.50 | 1,300 | 1,800(?) | 7,600 | 3.60 | 1,500 | 4 |
| 5 Chrome moly titanium | 5.0 | 0.5 | 0.50 max. | 0.10 max. | 0.40 | 1,300 | 1,500 | 12,000 | 4.06 | 1,000 | 1, 3 |
| 5 Chrome moly columbium | 5.0 | 0.5 | 0.50 max. | 0.15 max. | 0.60 | 1,300 | .... | .... | 4.40 | 1,000 | 1, 3 |
| 7 Chrome moly silicon | 7.0 | 0.5 | 0.75 | 0.15 max. | .... | 1,200 | .... | .... | 3.65 | 1,500 | 4 |
| 7 Chrome moly silicon | 7.0 | 1.0 | 0.75 | 0.15 max. | .... | 1,300(?) | .... | .... | 3.82 | 1,500 | 4 |
| 8 Chrome moly | 8.0 | 1.0 | 0.50 max. | 0.15 max. | .... | 1,300(?) | .... | .... | 3.94 | 1,400 | 3 |
| 9 Chrome moly silicon | 9.0 | 1.0 | 0.75 | 0.15 max. | .... | 1,300(?) | .... | 10,000(?) | 5.34 | 1,500 | 4 |
| 9 Chrome moly | 9.0 | 1.1 | 0.50 max. | 0.15 max. | .... | 1,300 | .... | 11,000 | ... | 1,400 | 5 |
| 13 Chromium | 13.0 | .. | ... | ... | .... | ... | .... | .... | ... | .... | 7 |
| 16 Chrome 13 nickel moly | 16.0 | 2.9 | 0.60 max. | 0.13 max. | 13.50 | 1,350 | 8,600 | high | ... | 1,600 | 5 |
| 18 Chrome 8 nickel | 18.0 | .. | 0.75 max. | 0.07 max. | 9.0 | 1,300 | 4,000 | 18,500 | 11.32 | 1,600 | 1, 3, 4, 5 |
| 18 Chrome 8 nickel titanium | 18.0 | .. | 0.65 max. | 0.07 max. | 0.4‡ | 1,300 | 5,000 | 18,500 | 13.22 | 1,600 | 1, 3 |
| 18 Chrome 8 nickel columbrium | 18.0 | .. | 0.65 max. | 0.07 max. | 0.7§ | 1,300 | .... | .... | 13.22 | 1,600 | 1, 3 |
| 25 Chrome 20 nickel | 25.0 | .. | 0.75 max. | 0.10 max. | 20.0 | 1,600 | 1,000 | high | 22.49 | 1,800 | 1, 3, 5 |

*Manganese about 0.50 per cent, sulfur 0.03-0.045 per cent, phosphorous 0.03-0.04. †Scaling should be less than 0.1 g. per sq. in. of surface when heated for 1,000 hours at the scaling temperature. ‡Ti 10.5 Ni. §Col. min. 10.5 Ni.

# Pipe-Line Activity

### Government Considers Construction of Baton Rouge-Port St. Joe, Fla., Line

WASHINGTON, D. C.—Chairman Vinson, of House naval affairs committee, today introduced a bill directing the Navy Department to investigate the need and practicability of constructing a government-owned pipe line from Baton Rouge, La., to Port St. Joe, Fla. This line would connect the Standard Oil of Louisiana refinery with the marine terminal of Southeastern Pipe Line Co. (Gulf and Pure). Secretary of Navy Knox is exerting his influence to have gasoline pipe lines constructed in southeastern states. Such pipe lines would provide the best means for supplying petroleum products to Army posts and flying fields in that area. The program of the Navy can be carried out more effectively if tankers now serving this area be freed for use elsewhere. In time of war it seems inadvisable to have this area depend on coastwise shipping for supplies of refined products.

### Texas-New Mexico Connects With Skelly Pool, N. M.

Outlet for the Skelly pool in eastern Eddy County, New Mexico, will be constructed by the Texas-New Mexico Pipe Line Co. from the Artesia district. It will be a 12-mile, 4-in. line, and will handle oil by gravity from 24-17-31, near the east border of the Skelly pool, thence southwest to 34-17-30.

At the latter point, a booster station will be installed.

### Improved Practices Increase Efficiency of Pipe Line

Cutting down an average of 60 normal-sized trees per hour, the new tree feller put into use by the Lone Star pipe-line department several months ago has proved to be valuable in clearing rights-of-way for the pipe-line crews, according to the company's publication, Blue Blaze News.

The machine is a crosscut saw operated by a 5-hp. gasoline motor which is used in clearing the rights-of-way to conform with the 30-ft. width regulation, according to Luther Tolbert, Lone Star assistant pipe-line superintendent. So well does the tree feller accomplish its job that trucks, mules and machinery can be moved in a direct line down the cleared right-of-way instead of being forced to dodge stumps.

The new equipment has two large handle bars upon which are the controls for the saw. The blade itself is approximately 4 ft. long and extends forward. Two wheels equipped with rubber tires carry the motor and saw easily over uneven ground. The operator of the machine walks between the handle bars and manipulates three levers controlling forward and reverse movements of the machine which moves along on its own power. Controls on the handle bars govern the speed of the jagged teeth, and while one man operates the lever on the handle bars, another man directs the saw holding a large wooden handle at its tip end.

The welding shop of the company gives special attention to practices which improve the efficiency of operating.

There was a time when valve seats of gate valves were pulled out when worn and sold for junk. Today the Lone Star shop men remove damaged seats, apply new metal by means of welding, and the part is sent to be refaced by machine work. Reassembled, the valve operates as efficiently as before and reclaiming of the damaged seat amounts to less than one-third of the cost of a new part for this purpose.

Cross-head pins for compressor engines of a certain make were once discarded when worn out. Now they are sent to the shop where reclaiming consists of welding more metal to the worn pins and machining them down.

Regulator station freezing is a problem of the gas-measurement men and ways and means of preventing this winter hazard have been sought. With the co-operation of the shop, a device has been developed which proves to be effective. Called an "alcohol injector," the device consists of a section of 12-in. pipe with closed heads and from this through ¼-in. openings alcohol is fed into the gas line as it approaches the regulator station. This keeps condensation from freezing in the regulator.

### Pure Operates Pipe-Line Systems at Capacity

Wabash Pipe Line Co. (Pure Oil Co. subsidiary) has been running at capacity. The company has been able to reduce field stocks by approximately 30,000 bbl. in the early part of the year. When the month ended field runs were off about 1,000 bbl. per day. The company's line to the Illinois Pipe Line Co.'s system has been recently completed.

At the end of the first quarter pipe-line pumpings of Detroit Southern Pipe Line Co. continue at capacity. During February, 419,664 bbl. of gasoline and furnace oil were pumped. This is regarded as a record for an operation of this type. The 400,000-bbl.-per-month mark has been hit continuously since last November. The main line consists of 6-in. pipe; pumping is done by one station.

### Magnolia Starts Operation Of Oklahoma City Line

Magnolia Petroleum Co. has been making plans to start operations early in April on the 200-mile pipe line connecting its distribution center at Oklahoma City, Okla., and its Fort Worth, Tex., refinery. Operation of the line was delayed until refinery work is completed.

### Toronto Pipe Line Lays Line at Cut Bank, Mont.

Toronto Pipe Line Co. is laying 9 miles of gathering line near Cut Bank, Mont., consisting of 4-in. and 3-in. pipe. The job has been contracted by R. McAdam, Cut Bank. The line runs south from 6-33n-5w to leases north of the river. At a later time the line may be extended to serve wells on the other side of the river. The company has recently built a 35-mile pipe-line system in the producing area near the southern part of Illinois-Indiana state line. This is complete with the exception of a few laterals which may be laid.

### Magnolia Lays Lateral Line

SAN ANTONIO, Tex.—Magnolia Pipe Line Co. is to start a lateral from its West Ranch-Sealy trunk line to the newly opened La Ward field of Jackson County, Texas. Contract for the line has been let.

The line will be 3 miles of 4-in., then 3½ miles of 6-in. from the La Ward terminal where a pumping unit will be built. Line will have for a terminus the Magnolia pump station near Vanderbilt in the West Ranch field of Jackson County. The La Ward field was opened a few weeks ago by Humble, only operator so far in the field though a number of other companies have acreage in the field.

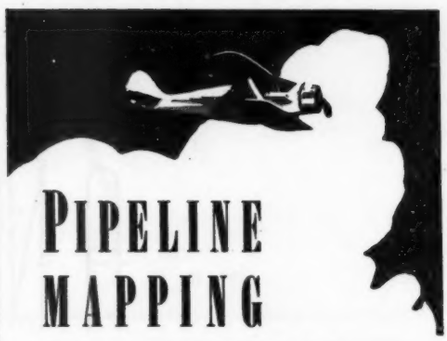
### Southern Buys Louisiana Gas Line From Apex

Purchase of a 32-mile pipe line and staking of two wildcats in De Soto Parish brought that area into the limelight during the last week.

Approval of the Securities and Exchange Commission was all that awaited transfer of the 32-mile pipe line from the Wemple plantation to Joaquin.

Southern Production Co., long active in the Joaquin-Logansport area, offered Apex Pipe Line Co. $300,000 for the 6-in. line.

Purchase price included an unspecified amount of gas from Portex Oil Co.'s gas-producing properties.

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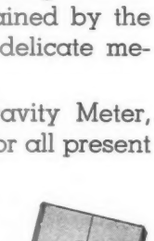


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# FIELD DEVELOPMENTS...

## HIGHLIGHTS FROM THE WEEK'S NEWS—

Spring drilling campaigns were getting under way this week and were reflected in the continued rise of the number of completions as well as the increase in new locations in most areas. While there were 58 more wells reported as completions this week than last, the gain was not so striking in view of the fact that Illinois reports delayed by bad weather last week were included this week. There was an appreciable increase, however, even when adjustments are made for this.

West Texas seemed to be one of the first areas to start the spring pickup. Forty-five wells were completed, only one of which was a failure, as compared to the usual 20 to 25 each week. That this increase was a trend was shown by the fact that 30 completions a week ago was above average, and also by the fact that 73 new locations were made as compared to 46 a week ago.

Oklahoma was also showing more activity, particularly in the southwestern part of the state where traditional state-line barriers were broken down and exploration was pushed across the Red River from North Texas. Operations along a northwest-southeast trend in North Texas have proved highly successful and observers have predicted for many months that sooner or later they would be extended into Oklahoma. Generally the two areas are believed to be very similar.

Discrepancies in crude prices in California, especially those for heavy crudes, were causing producers some concern and it was believed heavy-crude production would not be increased in line with demand until price adjustments were made.

**SOUTHWEST PENNSYLVANIA:** Hopes for important Bradford sand production on Fayette anticline were nearly gone after a test on the Clifton farm in Franklin Township of Fayette County had only a slight show of gas (p. 90).

**WEST TEXAS:** Drilling activity showed a marked upturn with 45 completions and 73 new locations. The Wasson field of Yoakum County had the greatest number of starts and the Slaughter field of Hockley and Cochran counties was next. Six wildcats were under way in scattered areas (p. 96).

**KANSAS:** The state's potential production, as calculated by the Corporation Commission, reached a new peak and a record daily allowable of 210,700 bbl. was recommended. New oil was found in several areas and oil shows were reported in Kearny County's wildcat (p. 99).

**WYOMING:** Another large well is nearing completion in the Wertz dome and the area is fast coming into first place in new developments. Some of its oil, together with that of Lost Soldier and Mahoney, is moving east (p. 110).

**SOUTHWEST TEXAS:** Showings of oil and gas drew attention to several areas, but no outstanding developments were reported (p. 91).

**LOUISIANA GULF COAST:** Production from a new sand in the Westwego area, about 12 miles west of New Orleans, was opened ¼ mile from proven production. The well, which opened the area in January of this year, has since been abandoned because of salt water. The newly opened St. Gabriel field in Iberville Parish was also extended, and a possible pool opener on the Port Allen prospect was being tested (p. 107).

**OKLAHOMA:** Leasing and wildcatting in the southwestern part of the state showed a decided gain in spite of the inadequate outlets at the present time for such producing fields in the same general area as Hobart and Altus. Two outposts to test limits of the new Guthrie pool were started and prices paid for Osage County leases were the highest in 8 years. East Stroud added a new producing horizon in the Prue sand (p. 92).

**TEXAS GULF COAST:** Completed for 119 bbl. of 26.7-gravity crude was the discovery well of the first field offshore from the Texas coast in the Gulf of Mexico. It is located off Jefferson County close to the Louisiana line. Earlier tests in the same field failed to get through the heaving shale, but favorable results of extensive geophysical work and opening of an offshore field near Louisiana caused operators to persist. A wildcat west of the Hamman field caused a stir when pipe was set after an electrical survey (p. 101).

**CALIFORNIA:** Steps were taken unofficially by the Producers Conservation Committee to boost production of heavy crude which has come into demand, but operators in the San Joaquin Valley hesitate to drill because of low prices. Some changes in the price structure have been made, but not enough to encourage new production. Wildcatters have moved into the coastal district and the Newhall-Castaic region is expected to become the most active area in the state. Meantime, another wildcat was testing the Cantua district of the San Joaquin Valley (p. 88).

**ILLINOIS:** There was news from the west side of the Illinois basin for the first time in many weeks as Devonian lime saturation was recovered from a test in the McKinley field. It is a mile north of a dry Devonian test drilled some time ago, but may give the newly opened McKinley field a new pay. Should the well pay off commercially, it would be the first time in the state's history that the Devonian produced where shallow horizons were dry. A second well was completed in White County's new pool (p. 104).

**NORTH LOUISIANA:** A new gas field along the Wilcox trend came in with a wildcat blowout, and while there was no sign of oil in the well, there were predictions oil might be found further downstructure. Shows of oil were reported earlier in the level which was perforated, and also in the higher Sparta horizon (p. 87).

**EASTERN TEXAS:** Drilling at Hawkins was up to the point that only the East Texas field had more operations under way. The thickest section of Woodbine sand yet reported for the Hawkins townsite, 221 ft., was logged in a well nearing completion (p. 98).

**NORTH CENTRAL TEXAS:** A development campaign was launched in the Coleman area of Clay and Archer counties as a Mississippian lime discovery was being tested 8 miles southeast of Henrietta (p. 94).

**WEST CENTRAL TEXAS:** Humble Oil & Refining Co.'s discovery in Throckmorton County bore the greatest promise of any well in the district in several years after it gaged 1,488 bbl. flowing. Production was found in a 31-ft. section of Caddo lime (p. 94).

## COMPLETIONS IN ALL FIELDS . . .

(Week Ended March 29, 1941)

| | Oil | Gas | Dry | Total | 1941 total comp. to date | 1940 total comp. to date |
|---|---|---|---|---|---|---|
| **N. Y., Pa., and W. Va.** | 53 | 19 | 4 | 76 | 1,003 | 888 |
| **Ohio** | 9 | 15 | 7 | 31 | 334 | 194 |
| **Indiana** | 4 | 0 | 1 | 5 | 94 | 74 |
| **Kentucky** | 1 | 1 | 2 | 4 | 116 | 86 |
| **Illinois** | 54 | 0 | 8 | 62 | 647 | 783 |
| **Michigan** | 5 | 1 | 7 | 13 | 197 | 302 |
| **Kansas** | 22 | 0 | 4 | 26 | 381 | 328 |
| **Oklahoma** | 15 | 4 | 13 | 32 | 319 | 396 |
| **Nebraska** | 0 | 0 | 0 | 0 | 17 | 0 |
| **Texas:** | | | | | | |
| **North Central Texas** | 31 | 0 | 24 | 55 | 600 | 725 |
| **West Texas** | 43 | 0 | 1 | 44 | 447 | 488 |
| **Texas Panhandle** | 10 | 0 | 0 | 10 | 117 | 135 |
| **Eastern Texas** | 18 | 1 | 2 | 21 | 256 | 188 |
| **Texas Gulf Coast** | 16 | 1 | 7 | 24 | 245 | 312 |
| **Southwest Texas** | 17 | 0 | 14 | 31 | 364 | 518 |
| **Total Texas** | 135 | 2 | 48 | 185 | 2,029 | 2,366 |
| **North Louisiana** | 2 | 0 | 1 | 3 | 132 | 138 |
| **Louisiana Gulf Coast** | 10 | 0 | 0 | 10 | 186 | 184 |
| **Total Louisiana** | 12 | 0 | 1 | 13 | 318 | 322 |
| **Arkansas** | 0 | 0 | 0 | 0 | 36 | 48 |
| **Mississippi** | 6 | 0 | 0 | 6 | 43 | 16 |
| **Montana** | 3 | 0 | 2 | 5 | 59 | 30 |
| **Wyoming** | 2 | 0 | 0 | 2 | 32 | 35 |
| **Colorado** | 1 | 0 | 2 | 3 | 9 | 6 |
| **New Mexico** | 1 | 1 | 0 | 2 | 70 | 157 |
| **California** | 15 | 0 | 4 | 19 | 250 | 233 |
| **Total United States** | 338 | 43 | 103 | 484 | 5,954 | 6,264 |
| **Total previous week** | 270 | 47 | 109 | 426 | | |
| **Week ended Mar. 30, 1940** | 370 | 29 | 107 | 506 | | |

# Shallow Sand Pool Is Opened; McClosky Pays at College

By STAFF CORRESPONDENT

EVANSVILLE, Ind., Mar. 31.—Prospects for a new shallow-sand pool in Vanderburg County seemed good last week when T. S. Drake 1 Nurrenbern, SE NE NE 6-7s-10w, filled with 230 ft. of oil, natural, from the Mansfield sand at 1,148-60 ft. After a 40-qt. shot, the hole filled with 550 ft. of 35-gravity oil and was showing for an estimated 25 bbl. a day. The 1 Nurrenbern is located about 1¼ miles from nearest production in the Hensler Dome field. The Mansfield sand has not proved productive in the Heusler field and at least three dry holes have been drilled between the field and the new discovery.

A second well in the College field of Posey County was showing for a McClosky producer last week. Miller et al 2 Oakland City College, SE NE SW 16-8s-14w, was cleaning out preparing to acidize lower McClosky pay at 2,670-83 ft. Upper McClosky break at 2,624-27 ft. was acidized with 4,000 gal. a short time ago and, alone, was estimated for about 25 bbl. a day and a small amount of water. The Miller well will probably be the first McClosky producer in the College field. Until approximately 2 weeks ago, when Bauman 1 Ritter, SW SW SE 8-3s-13w, recovered saturation in the McClosky at 2,687-97 ft., the Aux Vases sand was the only producing formation in the field. The 1 Ritter is now waiting on cement with casing set to the McClosky.

Meanwhile the completion of a Posey County wildcat about 2 miles west of Griffin was being delayed by a fishing job. Tools were lost at Cherry & Kidd et al 1 Pocket Realty Co. while operators were cleaning out after a 100-qt. shot in the Aux Vases at 2,846-73 ft. The test, located in NW NE NW 2-4s-14w, has been estimated as a 150-bbl. well.

## SUMMARY OF COMPLETIONS

| | No. | Bbl. | Footage |
|---|---|---|---|
| **Indiana** | | | |
| Oil wells | 4 | 409 | 9,069 |
| Dry holes | 1 | ..... | 862 |
| Total | 5 | ..... | 9,931 |
| **Ohio** | | | |
| | No. | Bbl. | Footage |
| Oil | 9 | 17 | 4,805 |
| Gas | 15 | *10.4 | 34,560 |
| Dry | 7 | ..... | 14,306 |
| Total | 31 | ..... | 53,671 |
| ***Eastern Kentucky*** | | | |
| Gas wells | 1 | *.4 | 2,811 |
| ***Western Kentucky*** | | | |
| Oil wells | 1 | 10 | 700 |
| Dry holes | 2 | ..... | 1,946 |
| Stratigraphic test | 1 | ..... | ..... |
| Total | 4 | ..... | 2,646 |

*Million cu. ft.

### INDIANA COMPLETIONS

**Daviess County**

**Cannelburg pool:** J. W. Cannon et al 6 Evans, NW SE NE 8-2n-5w, dry, water 716-20 ft., 803-09 ft., T.D. 862 ft.

**Gibson County**

**Griffin pool:** Hall Edwards 27-A Maier, SW SW SW NW 7-3s-13w, pumped 23 bbl., 20-qt. shot 2,525-32 ft., T.D. 2,532 ft.

**South Griffin pool:** Continental 20 Keck, NE NE SE 27-3s-14w, pumped 150 bbl., 5,000 gal. acid 2,864-68 ft., Ste. Genevieve 2,828 ft., T.D. 2,877 ft.

Continental 28 Bozeman, SW SW NE 23-3s-14w, pumped 135 bbl., 3,000 gal. acid 2,833-40 ft., perf. 2,867-72 ft., T.D. 3,526 ft., P.B. 2,885 ft.

**Posey County**

**Wildcat:** Jones & Appell 1 McFadden Island, NE NE SE SW 32-5s-14w, location abandoned.

**Spencer County**

Troy pool: C. E. Dice 1 Larch, SW NW SW NW 12-6s-4w, pumped 1 bbl. oil and show water, 40-qt. shot 760-75 ft., T.D. 775 ft.

### INDIANA DRILLING REPORT

**Crawford County**

Reece-Dietz et al 1 Esarey.....NE NW NE 36-3s-1w
T.D. 345 ft., fishing tools.

**Daviess County**

Newton P. L. 1 Dorsan.....NW SW SE 35-2n-5w
Drilling 1,950 ft. in dry hole.

**Gibson County**

C. A. Lynch et al 1 Blood.....SE SE NE 28-3s-14w
Rig, first report.
Mabee 1 Helm.....SW NW NW 27-3s-14w
First report, rigging up rotary.
Joe Bander et al 1 Dunn.....SW SE SW 18-3s-13w
Set 10-in. 144 ft., Waltersburg 2,081 ft., saturated sand 2,081-90 ft., 5-in. 2,081 ft., waiting on cement.
Turbeville et al 1 Heston.....NE NE SE 8-3s-13w
Drilling plug, tested salt water, T.D. 2,021 ft., will drill deeper.

**Knox County**

C. M. Lane et al 1 Morgan.....SW SE SW 32-2n-9w
S.D. 1,202 ft.

**Monroe County**

Terry Deskins 1 Thompson.....NE NW SE 18-9n-1e
S.D. 7,421 ft. (correction).
Terry Deskins 1 Cowling.....SW SW NW 34-7n-1e
New Albany 642 ft., Devonian 765 ft., S.D. 834 ft.

**Orange County**

United States Oil 1 G. E. Willyard NW NE SW 33-1n-1w
S.D. 570 ft.

**Posey County**

Ed Holemans et al 1 Oeth.....NE SE NE 6-4s-13w
Pumping 3 bbl. oil and 25 bbl. water a day.
Cherry & Kidd et al 1 Pocket Realty.....
NW NE NW 2-4s-14w
T.D. 2,885 ft., P.B. 2,873 ft., 100-qt. shot 2,846-73 ft., cleaning out and swabbing, est. 150-bbl. well.
Voorhees et al 1 Spencer.....SE SE SE 26-7s-15w
Location, first report.
McCummings et al 1 Ritter.....SW SW SE 9-8s-14w
S.D. 2,698 ft.

**Spencer County**

J. B. Miller et al 1 Dooley.....NW NE NW 19-7s-7w
S.D. 300 ft.

**Sullivan County**

W. J. Reynolds 1 Hyde.....SW NE NE 9-8n-10w
T.D. 665 ft., show oil 663-65 ft., running 8-in. at 650 ft.
Trio Dev. 1 Ridgeway.....SW SE 35-8n-10w
Spud, first report.
G. W. Boyce et al 1 Kelly.....SW SW NE 10-8n-11w
Set 16-in. 90 ft., drilling 630 ft.
E. M. Self 1 James Land.....NE NE NE 36-7n-9w
Drilling 400 ft.

**Vanderburg County**

C. J. Williams et al 1 Strueh....SW SW NW 6-7s-11w
Set 10-in. 65 ft., drilling 1,310 ft.
R. A. Mitchell et al 1 Keck.....NE SW SW 6-7s-11w
Spud, first report.
T. W. Drake 1 Nurrenbern.....SE NE NE 6-7s-14w
Oil pay 1,148-60 ft., 230 ft. oil, natural, 40-qt. shot 1,148-60 ft., now 550 ft., 35-gravity oil, T.D. 1,160 ft., putting on pump.

**Vigo County**

Sage & Farley 1 Campbell.....S½ NE NW 24-11n-8w
Drilling 2,207 ft.

## OHIO

NEWARK, Ohio, Mar. 31.—A 3,500,000-cu. ft. gasser 1 mile northeast of Newark in Licking County is expected to spur development in the eastern sector of the Newark field. Meigs County yielded a fair gas well in the Berea, and a Wyandot County test found Trenton formation regular and dip normal, abandoned at 1,370 ft. Of the 31 tests completed 9 were oil wells, 15 were gas, and 7 were dry.

The Ohio Oil Co. 8 Joseph Armstrong, Section 14, Wooster Township, Wayne County, is shut down at 5,049 ft. to run 5-⅞-in. casing before acidizing oil shows in the Trenton at 5,015-21 ft. and 5,035-39 ft. Top of Trenton was had at 5,005 ft.

In Mahoning County, Smith Township, the Magnolia Petroleum 1 Della Shrum has resumed operations, now drilling in the lime below 3,400 ft.

### OHIO COMPLETIONS

**Athens County**

Canaan Township: Ross, Weimer & Ross 1 Charles and Anna Mansfield, Fraction 8, 70,000 cu. ft. gas, first Berea, T.D. 1,835 ft.

Rome Township: Cook et al 3 M. B. Copeland, Fraction 36, 40,000 cu. ft. gas, second Cow Run (Maxon dry), T.D. 785 ft.

**Coshocton County**

Tiverton Township: Ohio Fuel 1 Ida Winslow, Sec. 8, dry, Clinton, T.D. 3,420 ft.

**Guernsey County**

Cambridge Township: Ronshausen et al 1 John McWilliams, Lot 19, dry, Gordon, T.D. 1,708 ft.

**Hocking County**

Ward Township: Preston Oil 190 Sunday Creek Coal Co., Sec. 6, dry, Clinton, T.D. 3,723 ft.

**Holmes County**

Richland Township: Ohio Fuel 1 Fred Michael, Sec. 5, 1,500,000 cu. ft. gas, Clinton, shot, T.D. 3,038 ft.

**Jefferson County**

Cross Creek Township: R. J. Braden Co. 18 Calvary Cemetery, SE Sec. 6, 1 bbl. before shot, Berea, T.D. 1,675 ft., may use as pressure intake.

**Knox County**

Union Township: Max Johnson 1 Catherine Wander, Danville corporation, 600,000 cu. ft. gas, Clinton, T.D. 2,850 ft.

J. B. Reed 1 J. Fesler, Danville corporation, 600,000 cu. ft. gas, Clinton, T.D. 2,775 ft.

Ohio Fuel 2 B. L. McMillen, Sec. 23, 830,000 cu. ft. gas, shot, Clinton, T.D. 2,914 ft.

**Licking County**

Madison Township: Ohio Fuel 1 James W. Weakly, Lot 11, second quarter, 3,500,000 cu. ft. gas, Clinton, T.D. 2,850 ft.

Mary Ann Township: H. C. Tighter 3 fee, Sec. 6, 2-bbl. pumper, Berea, T.D. 796 ft.

**Medina County**

Chatham Township: Fred C. Shaner et al 1 R. R. Hartman, Tr. 15, Lot 45, 1 bbl., Berea, T.D. 440 ft.

Fred C. Shaner et al 2 R. R. Hartman, 1 bbl., Berea, T.D. 462 ft.

Thornton Producing Corp. 21-F Sanford & Watson, Tr. 10, Lot 3, 1bbl., Berea, T.D. 357 ft.

Thornton Producing Co. 22-F Sanford & Watson, 1 bbl., Berea, T.D. 359 ft.

Thornton Producing Co. 23-F Sanford & Watson, 1 bbl., Berea 382 ft.

Thornton Producing Co. 24-F Sanford & Watson, 1 bbl., Berea, T.D. 387 ft.

Thornton Producing Co. 25-F Sanford & Watson, 1 bbl., Berea, T.D. 402 ft.

Thornton Producing Co. 25-O Sanford & Watson, input, Berea, 355 ft.

Thornton Producing Co. 26-O Sanford & Watson, input, Berea, T.D. 380 ft.

Thornton Producing Co. 27-O Sanford & Watson, input, Berea, T.D. 359 ft.

Thornton Producing Co. 28-O Sanford & Watson, input, Berea, T.D. 364 ft.

Thornton Producing Co. 29-O Sanford & Watson, input, Berea, T.D. 360 ft.

Thornton Producing Co. 30-O Sanford & Watson, input, Berea, T.D. 419 ft.

Thornton Producing Co. 34-O Sanford & Watson, input, Berea, T.D. 376 ft.

Thornton Producing Co. 35-O Sanford & Watson, input, Berea, T.D. 401 ft.

Thornton Producing Co. 36-O Sanford & Watson, input, Berea, T.D. 400 ft.

Liverpool Township: Obermiller Bros. 1 A. Abram, Sec. 8, dry, lime, T.D. 1,560 ft.

**Meigs County**

Orange Township: Ohio Fuel 1 D. T. Dean, Sec. 30, 1,700,000 cu. ft. gas, Berea, T.D. 1,703 ft.

Rutland Township: N. Shuster 1 Jessie McHaffie, Sec. 22, dry, Maxon, T.D. 822 ft.

Sutton Township: Pure 1 T. Hamm, Sec. 26, 69,000 cu. ft. gas, shale, T.D. 2,900 ft.

**Monroe County**

Summit Township: Myers et al 1 Mary Schwallie, Sec. 36, 40,000 cu. ft. gas, shot, Berea, T.D. 1,758 ft.

Wayne Township: J. H. Weber et al 1 Oscar Frank, Sec. 27, 8 bbl., Maxon sand, T.D. 1,220 ft.

**Noble County**

Seneca Township: J. T. Watson 1 S. F. Watson, Sec. 22, 50,000 cu. ft. gas, shot, Berea, T.D. 1,496 ft.

**Stark County**

Pike Township: Lyons et al 4 Barber Co., Sec. 3, 1,200,000 cu. ft. gas, Clinton, T.D. 4,785 ft.

**Washington County**

Barlow Township: Charles D. Togle 2 fee, Sec. 11, 65,000 cu. ft. gas, stray, T.D. 1,110 ft.

Grandview Township: Reno Oil 2 Simon Hall, Sec. 22, 30,000 cu. ft. gas, Injun, T.D. 1,641 ft.

Liberty Township: Fyteen O. & G. Co. 1 Schenkel, Sec. 10, 20,000 cu. ft. gas in Injun at 1,520 ft. (Berea dry), T.D. 2,020 ft.

**Wyandot County**

Richland Township: Pure Oil Co. 1 G. A. Kimmerly, Sec. 2, small show of gas, plugged, Trenton 131 ft., T.D. 1,370 ft.

## EASTERN KENTUCKY

ASHLAND, Ky., Mar. 31.—Completion of one gas well marks the report of drilling operations in eastern Kentucky this week. A slight increase in activities is noted with several rigs being set up in the various districts.

The Cumberland Petroleum deep test, 64 L. C. Bailey, has reached a depth of 4,530 ft. in brown lime after being idle several days at the 4,447-ft. level. A field report at that depth indicated a disagreement on the formation as to whether a gray lime encountered at the 4,447-ft. mark was a break between the Trenton and St. Peter sands, or whether it was still in Trenton. The report said about 20 ft. was made in three 8-

*(Continued on Page 101)*

By
GEORGE WEBER

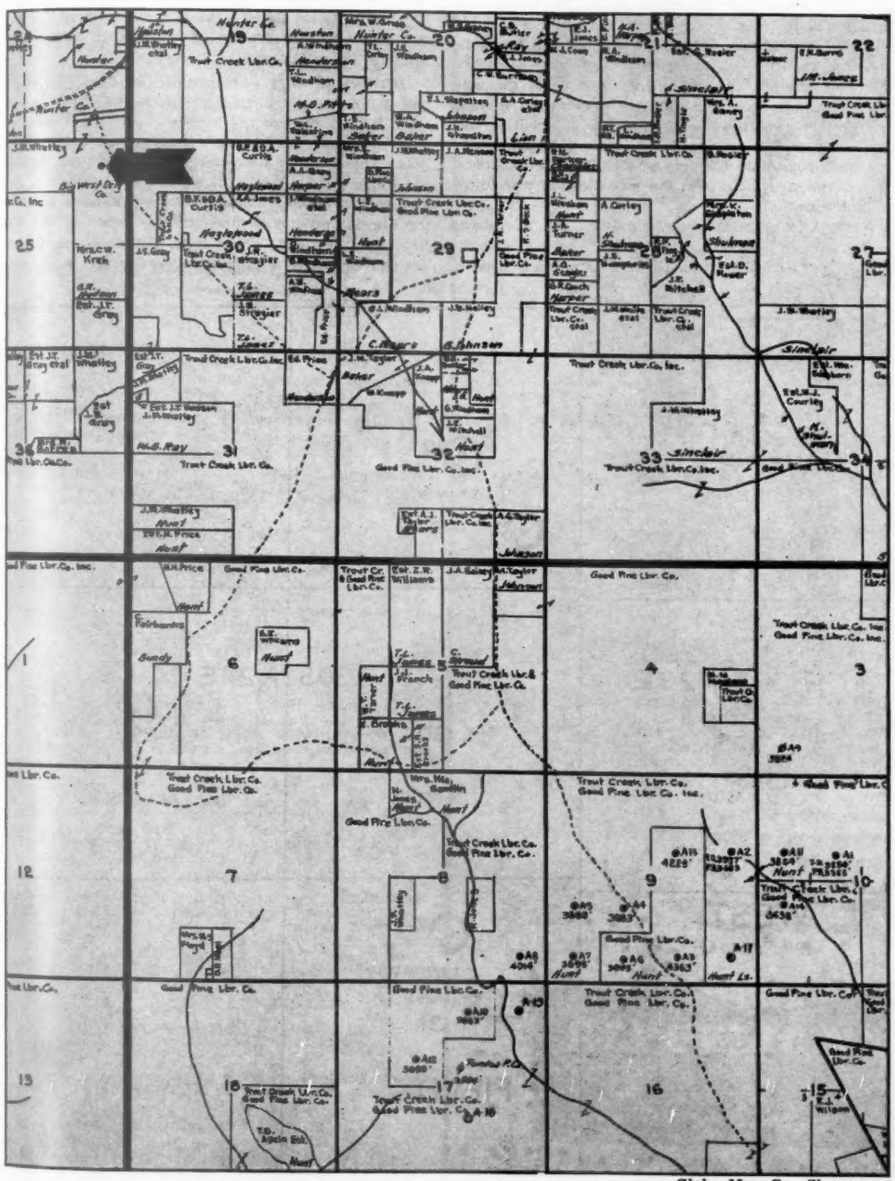
# New Wilcox Trend Gas Field Shown by Wildcat Blowout

SHREVEPORT, La., Mar. 31.—A wildcat blowout in La Salle Parish, Louisiana, increased the tempo of activity in the Wilcox trend last week and opened a new gas field for that area. A show of oil in the Greenwood gas field of western Caddo Parish also attracted much interest. South Arkansas developments are highlighted by favorable oil shows in a Miller County wildcat headed for the Smackover lime.

Big West Drilling Co. 1 Whatley, located in the northeast corner of 25-8-2e, about 4 miles northwest of the Jena oil field, La Salle Parish, tested gas early last week through perforations shot at 3,200-08 ft. Operators reperforated higher, and the well blew in, making 15,000,000 cu. ft. of gas. The gas ignited from a spark believed caused by a rock hitting the derrick. Professional wild-well fighters were called from Houston to kill the flow.

The Big West blowout locates another gas field for La Salle Parish. Although there is no sign of oil flow in the burning well, there is a possibility that oil may be encountered down structure from the blowout. Shows of oil were previously reported at the level perforated, and at a higher sand in the Sparta horizon. The blowout is from a Wilcox sand.

*Summerville.*—Developments are expected shortly at Summerville as wells drilling between the discovery gas well and the recently completed oil well in a northwest outpost position are nearing the pay horizon. To the west of the field, Placid Oil Co.'s two wildcats, 1 Doughty and 1-B Goodpine may shortly report developments of interest. The 1 Doughty has 7-in. casing set at 3,576 ft. and has perforated for a production test in the Wilcox horizon, and the 1-B Goodpine is awaiting pump after swabbing 50 per cent oil and 50 per cent salt water from 3,576-81 ft.



Globe Map Co., Shreveport

***Big West Drilling Co. 1 Whatley, La Salle Parish wildcat, located 4 miles northwest of the Jena oil field, blew out and caught fire last week, making an estimated 15 million cubic feet of gas. The blowout, indicated by arrow, brought the fifth show of oil or gas in La Salle wildcats in recent weeks, inciting considerable interest in the Wilcox play in that and surrounding parishes***

## SUMMARY OF COMPLETIONS

***North Louisiana***

| | No. | Bbl. | Footage |
|---|---|---|---|
| Oil wells: Olla | 2 | 195 | 4,657 |
| Dry holes: Wildcats | 1 | ..... | 5,250 |
| Total | 3 | ..... | 9,907 |

## Greenwood Test Is Coring

Delta Drilling Co. is coring ahead in 1 Thigpen-Herold, ½ mile northeast outpost to the one-well gas field opened by the same operators last year. The current test attracted considerable interest last week by coring a section showing oil. The core from 2,623-40 ft. showed small recovery, but sand had an odor of oil and gas. A second core at 2,640-58 ft. also failed to get much recovery, but the slight amount recovered showed oil. Although the core record is too incomplete to indicate definitely that oil saturation was encountered, the fact that the test is running lower than 1 Dunn, he Delta discovery well, a gasser, encourages interested parties in the test's oil possibilities. Operators did not make a drill-stem test, but are coring and drilling ahead.

*Lincoln Parish.*—Two deep tests in Lincoln Parish are coming into prominence as they reach critical depths. Big West Drilling Co. 1 Patton estate, located on the southeast edge of the Lisbon field, is approaching the Pettit lime and will drill deeper into the Cotton Valley formation to explore possibilities of oil saturation indicated in deep gas-condensate wells to the north and west on the Lisbon structure. At Simsboro, Herman Brown encountered a slight show of gas at 8,720 ft. in 1 Arkansas Louisiana Gas Co., a deepening job, formerly abandoned at 7,023 ft. The test is in the Cotton Valley formation, topped at about 8,650 ft.

### NORTH LOUISIANA COMPLETIONS

**Wildcat—Catahoula Parish**

H. L. Hunt 1 Southern Kraft ..... SE SE 19-10-6e
T.D. 5,250 ft., dry.

**Olla—La Salle Parish**

H. L. Hunt 8 Goodpine ..... NE NW 24-10-3
130 bbl., 32/64-in. choke, 8 per cent basic sediment and water, T.P. 70 lb., C.P. 260 lb., T.D. 2,407 ft., 7-in. casing 2,404 ft., perf. 2,176-2,210 ft.
Arkansas Fuel Oil 1-E Kees ..... NE SE 7-10-3e
Pumped 75 bbl., T.D. 2,250 ft., 7-in. casing 2,250 ft., perf. 2,209-21 ft.

### NORTH LOUISIANA DRILLING REPORT

**Bossier Parish**

R. L. Reese 1-A Bellevue Land Co. ..... SW NE SW 27-20-11
T.D. 3,007 ft., perf. 2,847-57 ft., swabbing brackish water.

**Concordia Parish**

K. Hughes 1 Nelson ..... NE NW 34-9-10e
Set 8⅝-in. casing 117 ft., drilling ahead.

**La Salle Parish**

Big West Drilling Co. 1 Whatley ..... NE NE 25-8-2e
Perf. 3,200-08 ft., tested gas, perf. higher, blew out, caught fire, T.D. 3,566 ft.
J. D. Crichett et al 1 Jones ..... NW NW 41-7-3e
T.D. 3,963 ft., 7-in. casing stuck, 2,700 ft., set 1,029 ft., 5½-in. casing 3,600 ft., waiting on cement.
M. L. Meredith 1 Grey ..... NE NE 36-8-2e
Rigging up.
Placid Oil Co. 1 Doughty ..... NE SW 32-9-2e
Set 7-in. casing 3,576 ft.
Placid Oil 1-B Goodpine ..... NE NW 33-9-2e
Waiting on pump, swabbed 50 per cent oil, 50 per cent salt water, T.D. 4,069 ft.

**Lincoln Parish**

Big West Drilling Co. 1 Patton est. ..... E½ W½ SE 7-20-4w
Drilling 4,350 ft.
Herman Brown 1 Ark. La. Gas Co. ..... SW NE 11-17-4
Drilling 8,779 ft., slight show gas 8,720 ft.

*(Continued on Page 90)*

# Adjustment of Heavy-Crude Price Sought by Producers

By
L. P. STOCKMAN

LOS ANGELES, Calif., Mar. 31.—A wide discrepancy was noted this week between crude-oil prices quoted by Standard Oil Co., General Petroleum Corp. and Union Oil Co., but this is to be expected in view of the wide disparity between heavy and light refining crude-oil production and the ridiculously low price of fuel oil and bunker fuel. Producers of heavy crude oil are aroused because of the increasing demand for heavy crude oil and their inability to secure a fair price for production as long as fuel oil remains at 70 to 75 cents per barrel for bunker fuel and commercial sales.

A few weeks ago, Standard Oil Co. increased the price of heavy crude oil 5 cents per barrel in San Joaquin Valley fields and this brought current prices for 14-gravity heavy crude oil to 65 cents per barrel. Union Oil Co. later posted a price of 64 cents per barrel for heavy 14-gravity crude oil in San Joaquin Valley fields with a gravity differential upward and downward.

Crude-oil producers can not understand why fuel-oil prices were cut 15 cents per barrel on January 1 of last year in the face of a declining market and why it has remained at this low level all during the period since that time when stocks of heavy crude and fuel oil have been consistently and substantially reduced to meet current demand. The interest of crude-oil producers in the fuel-oil market is due to the fact that in the past fuel-oil and heavy crude-oil prices fluctuated according to demand and on the basis of intrinsic value. The present abnormal price of fuel oil has obviously kept heavy crude-oil prices down to a point where there is little margin of profit. Present conditions are especially interesting because the Conservation Committee of California Oil Producers, official curtailment agency, has been attempting for several months to work out a formula that will permit an increase in heavy crude-oil production without resulting in an increase in light grades of refining crude oil.

At the last meeting of the conservation committee, the matter was postponed for a month after the committee had carefully considered seven suggested formulas and then discarded them as failing to accomplish the desired result. Heavy crude-oil production averaged 65,036 bbl. daily during the month of February and approximately the same amount during March. The conservation committee is not concerned with the price paid for heavy crude oil but as a matter of record it might not be amiss to mention the probability that if a base price of 75 cents was established for 14 to 17-gravity crude oil in San Joaquin Valley fields, they would not have much of a problem working out the method to increase heavy crude-oil production.

A 75-cent price would permit operators to clean out, acidize and otherwise rejuvenate a number of wells that have been shut in because of high lifting costs. Production of heavy crude oil under this stimulant would probably increase 10,000 to 15,000 bbl. per day and lead to additional drilling in fields producing heavy crude oil. The situation confronting heavy crude-oil producers is especially interesting because there is only about 31,000,000 bbl. of uncracked residual fuel oil on hand in addition to stocks of heavy crude. Stocks of heavy unrefinable crude oil have been reduced approximately 500,000 bbl. during the past year.

## SAN JOAQUIN VALLEY

The status of 27-13 Southern Pacific of Texas Co. in the Cantua district of Fresno County is expected to be determined within the next few weeks and, while recent reports from the well are of a pessimistic nature, it should be remembered that a final test has not yet been made of the upper part of the zone given a formation test a week or so ago. Numerous attempts have been made during the past 10 years to develop commercial production in the Cantua district without success. It is the best looking wildcat drilled in that district and Texas Co., with the logs of two wells drilled about 1 mile apart, should be able to spot a third well on a more favorable basis. The company's initial well in the Cantua district is supplying the gas necessary for 27-13 Southern Pacific and will be available for any further operations.

It would appear quite probable that Texas Co. will drill a third well in the Cantua district even though the present well fails to produce commercially. The Cantua district is a broad flat plain and there are are no topographic features to indicate the existence of possible structures, and the possible line of folding is undetermined.

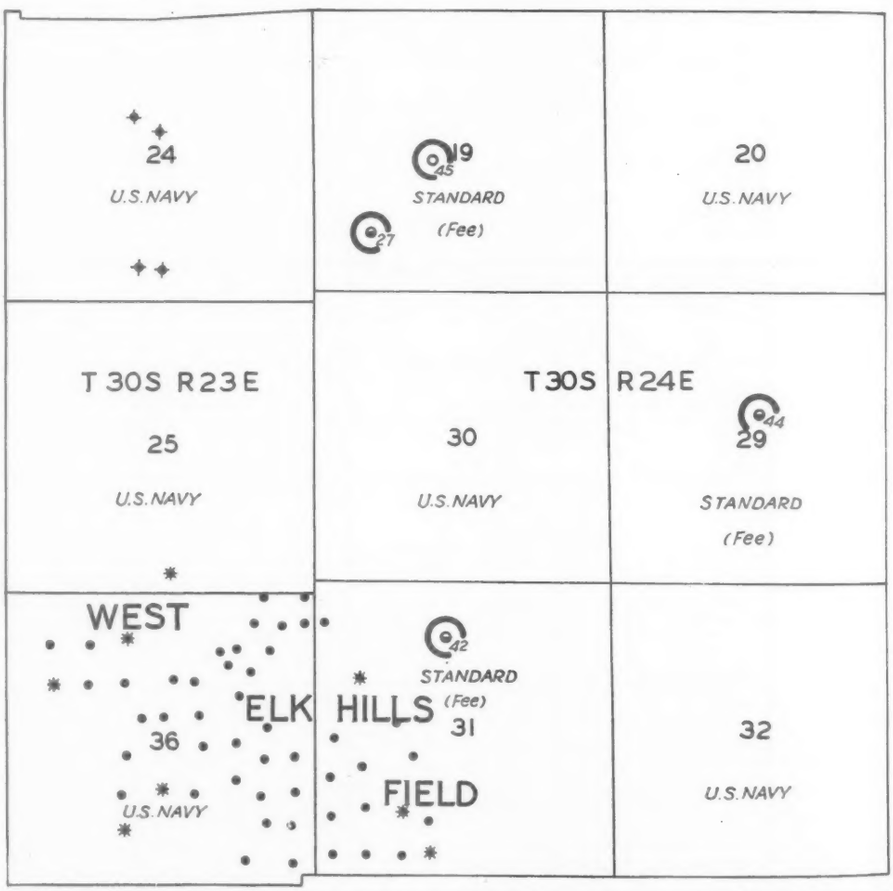
*WHEELER RIDGE.*—Richfield Oil Corp. has abandoned its 1 Tejon wildcat in 2-10n-19w as a duster at 10,940 ft. This wildcat which is located on an extensive lease failed to show anything encouraging from top to bottom and its abandonment has been expected for several weeks. Because of the large amount of acreage involved, Richfield will undoubtedly drill another test well in this area before pulling out. Richfield's geological department has been giving the southern end of San Joaquin Valley close scrutiny during the past 2 years and is probably not yet through.

This company recently abandoned its second wildcat in the Wheeler Ridge district and it is not yet known whether any further work will be done on this property. The company's initial well actually flowed at a good rate for several days and it looked for a time that Richfield had found a new accumulation south of the old Wheeler Ridge field. It is generally conceded on the basis of showings found by Richfield in its first Wheeler Ridge wildcat that Standard Oil Co. can expect deeper production when wells are drilled into the lower Miocene or Eocene.

*MIDWAY-SUNSET.*—Honolulu Oil Corp. although still drilling ahead in 25-P in 10-32s-24e in the Buena Vista Hills section of the Midway-Sunset field of Kern County appears to have the makings of a deep dry hole. This has not been definitely determined but at the well's present depth, 12,880 ft., the outlook is not any too favorable. Failure of the company to find the Stevens productive and extreme depth of the Rio Bravo and Vedder, which have not yet been found, has proved one of the biggest surprises in a long time.

### SUMMARY OF COMPLETIONS

| | No. | Bbl. | Footage |
|---|---|---|---|
| Oil wells: San Joaquin Valley | 8 | 10,260 | 55,920 |
| Coastal district | 1 | 125 | 7,700 |
| Los Angeles basin | 6 | 1,526 | 35,749 |
| Dry holes | 4 | ..... | 19,269 |
| Total | 19 | 11,911 | 118,638 |




*Standard Oil Co. has started several wells east and northeast of the Carmen or most westerly productive area in the Elk Hills field of Kern County, California. This is undoubtedly being done to establish property values of acreage adjacent to present production at Elk Hills which the Navy Department is desirous of converting into a naval reserve free of all drainage*

The Buena Vista Hills anticline, regarded as one of the finest in the state, has always been regarded as having excellent deep zone possibilities and operators even went so far as to formulate a unit plan of development a few years ago to take care of expected eventualities. North American is not yet deep enough in 1-28 in 28-32s-23e to reach its objective. Present formation is a hard shale.

## AVERAGE DAILY PRODUCTION

### LEADING CALIFORNIA FIELDS

| | Mar. 29 | Mar.22 |
|---|---|---|
| Wilmington | 82,550 | 81,750 |
| Long Beach | 41,575 | 42,160 |
| Midway-Sunset | 39,885 | 41,725 |
| Kettleman North Dome | 38,875 | 43,050 |
| Coalinga | 37,150 | 35,550 |
| Ventura Avenue | 33,370 | 33,825 |
| Huntington Beach | 28,180 | 27,425 |
| Santa Fe Springs | 23,975 | 23,875 |
| Dominguez | 21,625 | 21,425 |
| Santa Maria Valley | 19,775 | 19,725 |

## SAN JOAQUIN VALLEY COMPLETIONS

### Coalinga Southeast Field

R. S. Lytle 64-18-F ..... 18-20s-16e
Flowed 2,410 bbl., 31.7-gravity, 0.5 per cent cut, 1,100,000 cu. ft. gas. 28/64-in. bean. Pressures 700/1,100 lb. Elev. 857 ft. T.D. 8,041 ft. 8⅝-in. water string 7,418 ft. 643 ft. 6⅝-in. liner 8,041 ft. Perf. 7,437-7,745 ft., 7,781-8,041 ft. 7,982 ft. 2½-in. tubing. Kreyenhagen 6,260 ft., green sand 7,404 ft., Gatchell oil sand 7,486-8,038 ft. 43 days' drilling time. Fresno County.

Superior 6 Cagle ..... 6-20s-16e
Flowed 1,320 bbl., 31.2-gravity, 0.5 per cent cut, 855,000 cu. ft. gas. 32/64-in. bean. Pressures 1,075/1,375 lb. Elev. 710 ft. T.D. 7,085 ft. 8⅝-in. water string 6,738 ft. 366 ft. 7-in. liner 7,085 ft. Perf. 6,740-7,085 ft. 6,921 ft. 2½-in. tubing. Kreyenhagen 5,570 ft., green sand 6,615 ft., Gatchell oil sand 6,738-7,081 ft., bottom. 24 days' drilling time. Fresno County.

Standard 53-19-F ..... 19-20s-16e
Flowed 1,830 bbl., 26.9-gravity, 4 per cent cut, 1,028,000 cu. ft. gas. 40/64-in. bean. Pressures 450/500 lb. Elev. 717 ft. T.D. 7,765 ft. 7-in. water string 7,610 ft. 181 ft. 4¾-in. liner 7,761 ft. Perf. 7,610-7,761 ft. 7,716 ft. 2½-in. tubing. Kreyenhagen 6,360 ft., green sand 7,545 ft. Gatchell oil sand 7,650-7,765 ft. 55 days' drilling time. Fresno County.

### Grizzly Creek

M. B. Daly 1 Daly ..... 2-1n-2e
Abandoned in sand. Elev. 700 ft. T.D. 826 ft. No showings of any kind. Humboldt County.

### Kern River Field

D. K. K. Oil Co. 12 Kern ..... 34-28s-28e
Pumped 6 bbl., 13.1-gravity, 1 per cent cut. Elev. 665 ft. T.D. 385 ft. 7-in. combination string 385 ft. Perf. 279-385 ft., 374 ft. 2½-in. tubing. Kern County.

Stephens Oil Co. 1 Stephens ..... 34-28s-28e
Pumped 70 bbl., 13.1-gravity, 2 per cent cut. Elev. 678 ft. T.D. 520 ft. 8⅝-in. water string 435 ft. 100 ft. 7-in. liner 519 ft. Perf. 419-519 ft. 489 ft. 2-in. tubing. Completed in Kern River Series 385-518 ft. Bottomed in shale. Kern County.

### McKittrick Field

E. E. Smith 1 Smithhart ..... 34-30s-22e
Abandoned in shale. Elev. 1,325 ft. T.D. 2,300 ft. Small amount of oil sand logged at 997 ft. Kern County.

### Midway-Sunset Field

General Pet. Corp. 34-186A Moco ..... 34-12s-24e
Pumped 34 bbl., 13.7-gravity, 25 per cent cut. Elev. 1,080 ft. T.D. 945 ft. 435 ft. 8⅝-in. liner 944 ft. Perf. 679-944 ft. 840 ft. 2½-in. tubing. Deepened from 895 ft. to 1,134 ft. and then plugged back to 945 ft. Kern County.

### Rio Bravo Field

Superior 1-2 Osborn ..... 28-28s-25e
Flowed 1,510 bbl.,39.8-gravity, 0.3 per cent cut, 1,820,000 cu. ft. gas. 32/64-in. bean. Pressures 1,550/1,750 lb. Elev. 337 ft. T.D. 11,470 ft. 7⅝-in. water string 11,272 ft. 218 ft. 5¾-in. liner 11,470 ft. Perf. 11,272-11,470 ft., 11,019 ft. 2½-in. tubing. Rio Bravo 11,272 ft., Vedder 11,350 ft. Bottomed in Vedder oil sand. Kern County.

Superior 4 Smith ..... 34-28s-25e
Flowed 1,690 bbl., 38.6-gravity, 0.3 per cent cut, 1,730,000 cu. ft. gas. 32/64-in. bean. Pressures 1,500/1,750 lb. Elev. 331 ft. T.D. 11,400 ft. 7⅝-in. water string 11,336 ft. 70 ft. 5¾-in. liner 11,395 ft. Perf. 11,337-11,400 ft. 11,140 ft. 2½-in. tubing. Top Rio Bravo 11,336 ft. Kern County.

### Tupman Field

Richfield 16-28-B Kern County Land ..... 27-30s-25e
Flowed 1,424 bbl., 34.8-gravity, 1 per cent cut, 1,500,000 cu. ft. gas. Two 96/64-in. beans. Pressures 350/1,400 lb. Elev. 319 ft. T.D. 9,692 ft. P.B. 9,254 ft. 8⅝-in. water string 8,978 ft. 301 ft. 6⅝-in. liner 9,205 ft. Perf. 8,950-9,205 ft. 9,181 ft. 2½-in. tubing. Completed in equivalent of Stevens zone of Miocene age. 74 days' drilling time. Oil sand 8,991-9,205 ft. Bottomed in gray sand. Kern County.

### Tejon Field

Richfield 1 Tejon ..... 2-10n-19w
Abandoned as dry hole. Elev. 1,043 ft. T.D. 10,940 ft. 9⅝-in. protection string 6,968 ft. Fruitvale shale 3,580 ft., Basalt 5,675-6,449 ft. Bottomed in siltstone. Kern County.

### Union Avenue Field

Hancock Oil Co. 2 Roberts ..... 6-30s-28e
Abandoned in gray sand. Elev. 410 ft. T.D. 5,203 ft. Drilled on east side of Union Avenue field. Discovery well located west of fault. Kern County.

## SAN JOAQUIN VALLEY OUTPOSTS

### Coles Levee Field

Standard 20-8 Kern County Land ..... 5-31s-25e
T.D. 9,660 ft. in gray sand. P.B. 9,480 ft. Swab salt water with trace of oil. Will shoot with nitro. Elev. 430 ft. Kern County.

### Elk Hills Field

Standard 42-31-S ..... 31-30s-24e
Drilling and coring sand and shale 7,370 ft. Elev. 1,122 ft. Kern County.

Standard 44-29-S ..... 29-30s-24e
T.D. 3,900 ft., P.B. 3,230 ft. Making production test. Elev. 866 ft. Kern County.

Standard 27-29-S ..... 19-30s-24e
Drilling sand and shale 2,498 ft. Elev. 808 ft. Kern County.

### Kettleman North Dome Field

Standard 1-1-U fee ..... 1-23s-16e
Drilling gray sand 11,550 ft. Formation test with packer 10,762 ft., light blow gas with water. Bottomed in Eocene. Elev. 693 ft. Kings County.

### Midway-Sunset Field

No. Amer. Oil Consd. 1-28 W.P. ..... 28-32s-23e
Drilling 6,452 ft. in very hard shale with streaks of impervious sand. Elev. 1,560 ft. Kern County.

## SAN JOAQUIN VALLEY WILDCATS

### Buena Vista Hills District

Honolulu 25-P fee ..... 10-32s-24e
Drilling 12,880 ft. in shale with streaks of hard sand. Elev. 916 ft. Kern County.

### Cantua Creek District

Texas 27-13 Southern Pacific ..... 13-17s-15e
T.D. 9,673 ft., P.B. 9,440 ft. Formation test of oil sand 9,432-9,506 ft. Fair blow gas. Recovered 15 stands gas-cut mud, 3 stands fresh water. Ground elev. 340 ft. Fresno County.

### Bellevue District

Ohio Oil Co. 1-G Kern County Land ..... 36-29s-26e
Rigging up. Location 2,310 S, 1,640 E from NW cor. 36-29s-26e. Kern County.

Union 31-3 Kern County Land ..... 3-30s-26e
Drilling 7,784 ft. sand and shale. Stevens oil zone absent. Kern County.

### Buttonwillow District

Texas 47-15 Southern Pacific ..... 15-29s-24e
T.D. 8,122 ft. in sand and shale. Fish drill collar and bit. Elev. 287 ft. Kern County.

### Jasmine District

A. J. Borget 1 Kern ..... 16-25s-27e
Drilling in shale 1,110 ft. Elev. 632 ft. Kern County.

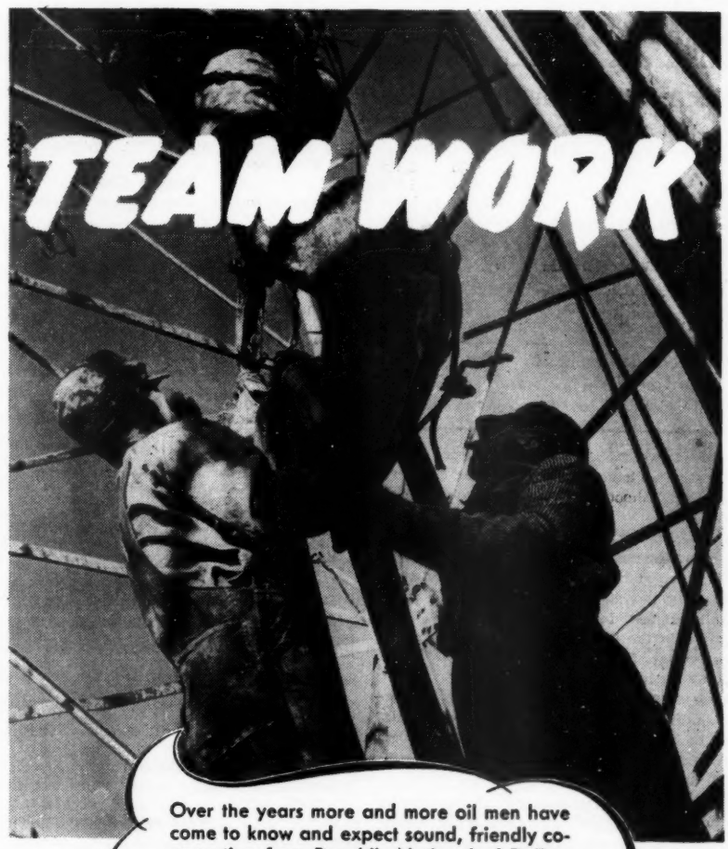
### Lost Hills District

Associated 46-13 fee ..... 16-27s-21e
Building road. Location 1,650 ft. N, 2,310 ft. E from SW cor. 16-27s-21e. Kern County.

### Dyer Creek District

Shell 77-11 Smith ..... 11-26s-27e
Drilling 1,229 ft. sandy shale. Located 5 miles NW of Mt. Poso field. Expect production in Vedder zone around 3,000 ft. Kern County.

*(Continued on Page 107)*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# Third Fayette Anticline Test Fails to Pay From Bradford

By STAFF CORRESPONDENT

PITTSBURGH, Pa., Mar. 31.—During the past week in the lower eastern fields 20 operations were reported completed of which four were dry, one of which was important; 14 gas wells, and two were oil producers with a daily initial of 45 bbl.

## SOUTHWEST PENNSYLVANIA

The test of Eberly et al on the Clifton farm on the Fayette anticline in Franklin Township, Fayette County, Pennsylvania, proved disappointing as there was only a small showing of gas in the Bradford sand which soon was exhausted. Thus the test on the Priscilla Brocco, northeast of the discovery well on the Charles Lerch farm, was dry, and to the southwest, on the Clifton farm, there was only a showing. The Bradford sand on the Clifton farm was topped at 3,566 ft. with gas showing at 3,568 ft. and the bottom of the sand at 3,570 ft. The hole was bottomed at 4,000 ft. The operators may shoot the Bradford sand before plugging.

On Chestnut Ridge in South Union Township, Fayette County, the New Penn Development Co., William E. Snee et al have started deepening No. 3 Summit Hotel (Heyn) after having the gas in the lines from the Onondaga chert beds for a week. The hole is 6,609 ft. deep or 44 ft. in the Oriskany sand from which so far there was no pay. Here Peoples Natural Gas Co. is drilling at 5,557 ft. in 4 Piedmont Coal Co. with the hole crooked at 5,424 ft. and filled back to 5,410 ft. After redrilling the section, it will now be tested. In North Union Township Wasson & Co. et al have drilled past the lost bailer and reached 6,780 ft. in 2 J. H. Sorg.

In Maryland New Penn Development Co. et al are still trying to straighten the hole at 4,842 ft., at which point casing stuck in the test on the Humberson farm on the Accident dome in Garrett County. In Fayette County, Pennsylvania, these operators are cleaning out preparatory to start drilling again in the wildcat on the Gregg L. Neal farm on Laurel Ridge in Stewart Township.

### Armstrong County

**Plum Creek Township:** Peoples 2 Wm. J. Boyer, 22,000 cu. ft. gas, Bradford sand, T.D. 3,724 ft.

### Fayette County

**Franklin Township:** Eberly et al 1 Clifton, dry, Bradford sand, T.D. 4,000 ft.

### Greene County

**Monongahela Township:** Greensboro Gas 1 Longenecker, 158,000 cu. ft. gas, Bayard sand 2,919-48 ft., gas gaging 30,000 cu. ft. at 2,920 ft.; Elizabeth sand 2,972-82 ft., gas 2,974 ft.; T.D. 3,095 ft.

### Indiana County

**Center Township:** T. W. Phillips 1 Charles Johnston, dry through Bradford sand, T.D. 3,311 ft.

### Washington County

**Morris Township:** Union Gasoline & Oil 4 W. E. Craft, 20 bbl.; Fifth sand 2,781 ft., oil 2,796 ft. and 2,800-07 ft., T.D. 2,812 ft.

## SUMMARY OF COMPLETIONS

*Southwest Pennsylvania*

| | No. | Bbl. | Footage |
|---|---|---|---|
| Oil wells | 1 | 20 | 2,812 |
| Gas wells | 2 | *.18 | 6,819 |
| Dry holes | 2 | ..... | 7,311 |
| Total | 5 | ..... | 16,942 |

*West Virginia*

| | | | |
|---|---|---|---|
| Oil wells | 1 | 25 | 3,177 |
| Gas wells | 12 | *7.37 | 36,402 |
| Dry holes | 2 | ..... | 5,132 |
| Total | 15 | ..... | 44,711 |

*Million cu. ft.

## DRILLING

### Armstrong County

**Boggs Township:** John Wray et al 3 Ralph Williamson, 3,150 ft.
J. K. Sharp et al 2 James Sefton, location.
**Cowanshannock Township:** William McCollins 1 A. L. McCullough, 680 ft.
George K. Gray 1 J. W. Blose, 1,360 ft.
Equitable Gas 2 William Carroll, 390 ft.
**Kiskiminitas Township:** Peoples 1 R. O. Hunter, 1,988 ft.
**Kittanning Township:** L. L. Lovingood et al 1 H. Wright, 2,138 ft.
Equitable 1 Mary Stitt, 3,001 ft.
Local Co. 1 S. E. Heilman, 2,170 ft.
**Plum Creek Township:** Peoples 1 Quinter Boyer, 675 ft.
James Wright 1 fee, 2,935 ft.
**Red Bank Township:** Local 1 S. Kunselman, 700 ft.
**South Bend Township:** Equitable 1 Margaret Claypool, 300 ft.
**Valley Township:** Humphrey, Stone & McCall 1 J. MacAfoose, 2,624 ft.
**Wayne Township:** R. C. Galbraith et al 2 William Alcorn, location.

### Clarion County

**Limestone Township:** Owens Illinois Glass 1 Clark Steel, 2,200 ft.
**Monroe Township:** Owens Illinois Glass 2 J. W. Aites, 1,900 ft.
**Red Bank Township:** T. W. Phillips 1 Daniel Wolfgang, 900 ft.

### Fayette County

**German Township:** Eberly et al 2 Feliz Valerio, 2,140 ft.
Greensboro Gas 1 Stephen Haningosky, 1,250 ft.
**Menallen Township:** J. H. Cornell 1 G. F. Newman, location.
**Nicholson Township:** Duquesne Gas 2 Jacob Cover, 240 ft.
C. V. Emmers 1 Joseph Vaslaviski, 750 ft.
Nollem Oil & Gas 1 McCann, 1,607 ft.
Wahler-Powers 2 Geneva Supply, 70 ft.
**Springhill Township:** Marker Stephenson 1 J. and A. Brojkovitch, 40 ft., S.D.

### Greene County

**Center Township:** Manufacturers L. & H. 1 E. W. Wood, building rig.
**Jackson Township:** Equitable 1 Clara Roberts, 1,520 ft.
Peoples 1 Roy L. Wise, 1,815 ft.
H. E. Milliken et al 1 E. Chaney, Gordon sand 3,030-65 ft., 28,000 cu. ft. gas at 3,035 ft., drilling 3,120 ft.
Cleveland-Cameron 1 Cleveland Morris, 3,160 ft.
**Monongahela Township:** Equitable 1 William Hart, 1,450 ft.
D. E. Mayne et al 1 Andrew Kovack, 2,310 ft.
Judson Bell et al 2 E. R. Gabler, 1,558 ft., S.D.
Judson Bell et al 3 E. R. Gabler, building rig.
Brummage et al 1 Robert Whooley, 1,835 ft., top Big Injun sand 1,700 ft.
John Conklin 1 S. L. Mestrezar, 590 ft.
**Morris Township:** Lewis Petit et al 1 A. J. Murray, location.
Romney Rutan et al 1 Albert Rutan, 1,820 ft.
**Perry Township:** Equitable 1 C. D. Wade, moving in.
**Richhill Township:** Charles Hart et al 1 Ross Galloway, 418 ft., S.D.
**Springhill Township:** H. E. Milliken et al 1 John Minor, 1,550 ft.
**Wayne Township:** Lee Wise et al 1 Henry Hixenbaugh, building rig.
**Whiteley Township:** H. D. Freeland et al 1 Morris B. Fox, building rig.

### Indiana County

**Armstrong Township:** T. W. Phillips 1 Lewis Weiss, 2,685 ft.

### Washington County

**Amwell Township:** Bungard et al 1 Lucille Frazee, 690 ft.
**Hanover Township:** D. D. Caldwell et al 3 Evaline Caldwell, 1,800 ft.
**Morris Township:** Conger et al 1 C. W. Archer, 1,640 ft.
Carnegie Natural 2 Nelan heirs, 2,115 ft., top Big Injun 1,934 ft.
**Mount Pleasant Township:** McGuigan et al 1 H. S. Buchanan, 570 ft.
**Somerset Township:** Equitable 1 Jerry Myers, in sand 1,271 ft.
**West Bethlehem Township:** Carnegie Natural 3 Chartiers Southern R. R., 2,832 ft.
**West Finley Township:** Natural Gas Co. of W. Va. 1 Robert Marshall, 2,770 ft.

### Westmoreland County

**Allegheny Township:** Peoples 1 Howard Wise, 3,176 ft., S.D.
**Bell Township:** Peoples 2 J. F. Wolford, 3,285 ft.
Dome Gas 1 S. D. Carnahan, location.
**Upper Burrell Township:** Peoples 1 W. H. Wylie, 3,125 ft.

## WEST VIRGINIA

In Monongalia County the wildcat of the Hope Natural Gas Co. on the H. C. Greer et al lease in Morgan district set 686 ft. of 11-in. casing in gray slate and continued drilling. It is nearing 900 ft. In Harrison County the deep rotary test on the C. S. Gribble farm in Grant district is drilling at 9,943 ft.

### Boone County

**Washington district:** Hope Natural Gas 8505 H. Nunnencamp, 25 bbl. and 750,000 cu. ft. gas after shot; Berea, T.D. 2,800 ft., T.D. 3,177 ft.

### Braxton County

**Birch district:** Pittsburgh & W. Va. Gas 7788 Ed L. Boggs, 270,000 cu. ft. gas, Blue Monday sand, T.D. 1,594 ft.
Pittsburgh & W. Va. Gas 7778 G. E. McMorrow, dry, through Injun, T.D. 2,018 ft.

*(Continued on Page 98)*

## North Louisiana, Arkansas

*(Continued from Page 87)*

### Sabine Parish

Plummer & McDaniel 1 Phares....NW NW SW 4-15-12
Set 16-in. casing 70 ft., S.D. 98 ft.
Roy Raines 1 Carter .....SW NW NW 27-9-11
S.D. 2,403 ft.

### Winn Parish

Sells Pet. Co. 1 Feazel et al.....NE NW 26-13-3w
First report.

## ARKANSAS

Louark Producing Co. has encountered favorable oil shows in the 1 Hedrick, a wildcat in Miller County about 5 miles northeast of the Rodessa extension in Arkansas. Operators cored at 6,190-6,210 ft. recovering hard tight lime. A second core taken at 6,210-23 ft. showed 7-ft. recovery, the top 2 ft. of which was hard tight oolitic lime with slightly porous streaks and good taste and odor of oil. The bottom 5 ft. was tight grey lime. A drill-stem test was made at 6,201-32 ft. using ¼-in. chokes top and bottom. A slight blow in 15 minutes resulted, and 160 ft. of mud with taste and odor of oil was recovered. There was no show of water. This show in the Rodessa member of the Glen Rose may indicate further oil in deeper formations. The test is drilling ahead.

*McKamie.*—Atlantic Refining Co. drilled 3 Bodcaw to a total depth of 9,980 ft. to explore the possibilities of a water drive, or further oil saturation in the Smackover lime at McKamie. Neither was found and the test will be completed in the main porous section near the top of the Smackover lime at 9,146-9,268 ft. The same operator's 4 Bodcaw is being completed in that section. McKamie is the center of attention in Arkansas currently, due to oil shows in the Barnsdall Oil Co. 1 Cornelius, an east-edge test and the lowest in the field as now developed. Production tests in the Barnsdall well are expected to reveal whether or not oil is being produced from a separate porous lime section encountered below the main zone.

### ARKANSAS DRILLING REPORT

#### Clark County

Christman, Coker & Grieves 1 Sparkman .....
NW NE NE 11-11-20
Moving in material.
Coker, Christman & Grieves 1 Williams.....
NE NE NE 7-11-20
Rigging up.

#### Columbia County

Crow Drlg. Co. 1 J. W. Smart.....SW SW 12-15-20
T.D. 6,050 ft., waiting on pump.
R. H. Crow, Tr., et al 1 D. M. Green..NW SE 11-15-20
Set surface casing, waiting on cement.
McAlester Fuel Co. 1 Franks.....SE SE 16-18-21
Rigging up.

#### Faulkner County

Cato Oil Co. 1 R. R. Harrell.....SE SW 35-4n-12w
Drilling shale 3,543 ft.

#### Miller County

K. E. Jennings and J. J. Oil Co. 1 H. T. Wood .....
NE NE 33-18-28
Old well, old T.D. 4,574 ft., to deepen.
Louark Prod. Co. 1 E. J. Hedrick et al.....
SE NE 27-19s-27w
D.S. test 6,201-32 ft., recovered 160 ft. mud, odor oil, drilling 6,295 ft.

#### Prairie County

Alvin E. Stark 1 Fidelity Mutual..NE NE SW 16-2n-8w
Drilling shale 836 ft.

#### Union County

C. H. Murphy 1-C Cates .....NW SW 33-18-15
(Deep El Dorado test) T.D. 7,820 ft., testing.

### EAST TEXAS BORDER DRILLING REPORT

#### Cass County

W. A. Patterson 1 Orr, Morris Sur., drilling 1,689 ft.

#### Marion County

D. L. Butler et al 1 W. G. Bailey, Robert Maxwell Sur., S.D. 3,505 ft.
A. J. Vestal et al 1 C. Moseley, David Lane Sur., S.D.
P. L. Withers et al 1 T. G. Allen, Robert Potter Sur., S.D. 2,366 ft.

#### Sabine County

Sturm & Womack 1-A Keith, L. Grace Sur., drilling 5,427 ft.

#### San Augustine County

Roper Todd 1 Long Bell Lumber Co., N. Hyden Sur., S.D. 793 ft., new rig.

#### Shelby County

Cougar Oil Co. 1 Jones, John Latham Sur., S.D. 2,509 ft.

# Wildcats Are Nearing Crucial Stage; Field Work Steady

By F. L. SINGLETON

CORPUS CHRISTI, Tex., Mar. 31.—There were no outstanding developments in the Southwest Texas district the past week. Showings of oil and gas were attracting attention to several scattered wildcats, while wildcatting and field operations continued to be maintained at a steady pace.

Main interest in the Balcones fault-line district was centered on Humble 1 Catarina Farms, a wildcat about 3 miles northwest of the Catarina townsite in Lee County which is drilling ahead in shale after coring sand and shale and oil odor at 4,527-30 ft., and at 4,598-4,613 ft. A 30-minute drill-stem test at 4,586-4,613 ft. recovered 10 ft. of drilling mud with no working pressure. A previous test at 4,455-85 ft. recovered 10 ft. of drilling mud with a slight show of oil.

In Bastrop County, and located about 3½ miles east of Elgin in the George Glasscock Survey, Marts & Beaven 1-A Walker encountered a show of oil on pits when drilling was resumed after being shut down for several days at a total depth of 2,860 ft. The well at the close of the week was waiting on orders. The showing of oil is believed to be from the Austin chalk, although the top of the formation was not announced.

H. F. Wilcox Oil & Gas Co. 1 Walker, a wildcat located east of the Salt Flat field, Caldwell County, is being watched with considerable interest as it cores for the Edwards lime at 3,563 ft. The Austin chalk was topped at 3,111 ft., and the base of the section was logged at 3,385 ft. The Buda lime was topped at 3,405 ft., the Del Rio lime at 3,473 ft., and the Georgetown lime at 3,504 ft. No showings of oil and gas have been reported.

## SUMMARY OF COMPLETIONS

### Lower Gulf Coast

| | No. | Bbl. | Footage |
|---|---|---|---|
| Oil wells: Fields | 7 | 715 | 37,722 |
| Dry holes: Fields | 2 | ..... | 12,064 |
| Wildcats | 1 | ..... | 10,341 |
| Total | 10 | ..... | 60,127 |

### Laredo District

| | | | |
|---|---|---|---|
| Oil wells: Fields | 7 | 693 | 21,989 |
| Dry holes: Fields | 5 | ..... | 14,734 |
| Wildcats | 4 | ..... | 11,888 |
| Total | 16 | ..... | 48,251 |

### San Antonio District

| | | | |
|---|---|---|---|
| Oil wells: Fields | 3 | 664 | 7,173 |
| Dry holes: Wildcats | 2 | ..... | 11,049 |
| Total | 5 | ..... | 18,222 |

## Test Near Carrizo Springs Shows Oil

Southeast of the newly opened Carrizo Springs field, Dimmit County, Diamond Half Oil Co. 1 Kirk, about 2,200 ft. southeast of the discovery well, is holding considerable interest as sand with an oil odor was cored at 2,302-07 ft., 2,357-65 ft., while additional showings were reported at intervals from 2,365-42 ft. The discovery sand is believed to have shaled out, and the well is reported to be running about 30 ft. structurally lower than the discovery well. Offsetting the discovery well to the northeast, Spencer & Huck 1 McKnight & Catlett is drilling below 1,808 ft. Sand with a gas odor was logged at 1,697-99 ft., while a 1-hour drill-stem test at 1,370-86 ft., recovered drilling mud and salt water.

In the Corpus Christi area, Southern Minerals 1 R. H. Wood, the discovery well of the Woodsboro field, Refugio County, continues to test, and on a recent gage the well flowed an estimated 350 bbl. of fluid per day through a ¼-in. choke. Tubing pressure was 525 lb. and shut-in casing pressure 2,025 lb. Production is from the Frio sand through perforated casing at 5,900-03 ft.

In Calhoun County, and located 1,300 ft. southeast of the discovery well of the new Coloma Creek field, McSpadden Co. 1-B Clark is bottomed at 5,951 ft., and casing is reported to have been cemented for a production test although details as to what showings have been logged were not available. The discovery well was completed early in January from the Frio sand at 5,800-5,900 ft. In San Antonio Bay, drilling was started on Gulfboard 1-177 State, a projected 7,000-ft. test.

Wildcatting along the Jim Wells County sector of the Frio-Vicksburg trend was being revived with the announcement of two wildcat tests. One mile south of Ben Bolt, and located in the La Trinidat grant, Rowan & Hope are moving in material for 1 Kyniti, while 1½ miles west of the town of Orange Grove, Arkansas Fuel Oil Co. staked location for 1 E. H. Brieger, located in the S.A.&M.G. Survey, Section 125.

Ohio Oil Co. entered the La Gloria field, Jim Wells County, by staking location for 1 Ralph Mallett in Lot 7, Block 3, adjoining the La Gloria townsite in the Los Olmos y Loma Blanca grant. The location is an east offset to Magnolia 1 Hornsby, a gas-distillate producer.

## Agua Dulce Field Extended East

Gas-distillate production in the Agua Dulce field, Nueces County, was extended several hundred feet eastward as Warren & Ginther 1 Eggert is reported to have flowed an unestimated amount of gas and distillate while testing through perforated casing at 5,900 ft. Total depth is 7,502 ft., and 5½-in. casing was cemented at 6,950 ft. In the same area Shasta von Blucher is drilling in shale below 7,490 ft. Another important test drilling along the Agua-Stratton trend is Seaboard 1 Kansas City Life Insurance Co., a northeast outpost in the SW Section 196 of the F. Z. Bishop Palo Alto subdivision, which is drilling in shale below 3,800 ft.

Interest in the Laredo district was centered on a wildcat west of the Cole field in Webb County which cored sand with an oil odor and casing was cemented for a production test. The well is 1 Benavides in Survey 663. Sand with an oil and gas show was cored at 2,367-71 ft., the total depth, and 5½-in. casing was cemented at 2,367 ft. after two drill-stem tests failed.

In Jim Hogg County, and located about 1 mile northwest of its recently abandoned 1 McCampbell, Sun Oil Co. staked location for 1 Eustacio Montalvo in the Las Vivoritas grant, about 8 miles south of Hebronville. Two miles west of the Colorado field, Forrest Development Co. 1 Ramirez perforated casing at 1,997-2,002 ft., and on a drill-stem test recovered drilling mud, 100 ft. of brackish water and tested 13 lb. working pressure. This well was drilled to a total depth of 3,006 ft., and 5½-in. casing was cemented the previous week after an electrical survey and sidewall cores showed promise of production in the Mirando sand at intervals from 1,999-2,008 ft.

Pan American 1 G. C. Kent, about 1½ miles northwest of the discovery well of the Willamar field, Willacy County, which has been in the process of completion for the past few weeks, reperforated casing at 7,925-70 ft., and in 18 hours, the well swabbed and flowed 87 bbl. of oil. Southeast of the discovery well about 1,000 ft., the company's 1-B Community is being tested through perforated casing at 7,855-80 ft.

## SOUTHWEST TEXAS COMPLETIONS

### LOWER GULF COAST DISTRICT

**Aransas County**

Wildcat: Humble 1-27 State, dry, T.D. 10,341 ft.

**Jim Wells County**

Wade City field: Bridwell 1 Laging, dry, T.D. 4,903 ft.
Lewis Production Co. 2 Stech, 98 bbl., ⅛-in. choke, perf. casing 4,800-04½ ft., T.D. 4,812 ft.

**Nueces County**

Clara Driscoll field: Texas Conservative 2 Huie, 102 bbl., 11/64-in. choke, top sand 5,615 ft.
East Flour Bluff field: Humble 1-J State, 132 bbl., ⅛-in. choke, T.D. 7,407 ft.
South Clara Driscoll field: Texas Conservative 12-B Flynn, 118 bbl., ⅛-in. choke, perf. casing 4,697-4,702 ft., T.D. 5,897 ft.
Stratton field: Bay-Tex 10 Union Central Life Insurance Co., dry, T.D. 7,161 ft.

**San Patricio County**

Midway field: Midway Victory Co. 4-A Floerke, 120 bbl., plus 10 per cent salt water, ⅛-in. choke, perf. casing 5,324-27 ft., T.D. 5,352 ft.

**Victoria County**

Coleto Creek field: Averill & Cox, 75 bbl., ⅛-in. choke, perf. casing 2,844-60 ft., T.D. 2,909 ft.
McFaddin field: Houston 7 Fagan, 770 bbl., 6/64-in. choke, perf. casing 5,304-08 ft., T.D. 5,319 ft.

### LAREDO DISTRICT

**Duval County**

Cedro Hill field: Magnolia 26 Duval County Ranch Co., dry, T.D. 1,602 ft.
Charamousca field: Magnolia 5 Duval County Ranch Co., 60 bbl., pumping, perf. casing 1,534-35 ft., T.D.
Hoffman field: Cox & Hamon 36 Cuellar, dry, T.D. 3,139 ft.
Cox & Hamon 43 Cuellar, 36 bbl., pumping, perf. casing 2,820-25 ft., T.D. 3,470 ft.

**Hidalgo County**

Nichols field: Baldridge & King 3 Yturria Town & Improvement Co., 88 bbl., ¾-in. choke, perf. casing 3,672½-77 ft., T.D. 3,961 ft.

**Jim Hogg County**

Colorado field: V. F. Neuhaus, 125 bbl., 1-in. choke, sand 2,954-65 ft., T.D.
C. F. Andrade 1-G Trevino, 60 bbl., 1/8-in. choke, sand 2,922-26 ft.
Holbein field: Guy Davis 1-B Holbein, 111 bbl., jetting, sand 2,815-34 ft., T.D.
Wildcats: William F. Morgan 1, dry, T.D. 3,116 ft.
Sal Vieja 1 Pena, junked, T.D. 3,120 ft.

**McMullen County**

Wildcat: Argo Oil Corp. 1-A Daily, dry, T.D. 3,129 ft.

**Starr County**

Kelsey field: Humble 80 McGill, dry, T.D. 4,926 ft.
Rincon field: Continental 30-B Slick, 213 bbl., 4/64-in. choke, perf. casing 4,082-4,111 ft., T.D. 4,298 ft

**Webb County**

Glen field: Interstate Minerals 58 Lopez, dry, T.D. 2,188 ft.
West Cole field: O. W. Killam 1 Benavides, dry, T.D. 2,519 ft.
Wildcat: O. W. Killam 1 Longoria, dry, T.D. 2,523 ft.

### SAN ANTONIO DISTRICT

**Caldwell County**

Bee Creek field: Ralph Ogden 5-B Miears, 366 bbl., 12 hours, open casing, T.D. 2,292 ft.
Tenney Creek field: Wiegand Bros. 3 DeVaughn, 12 bbl. per hr., ¼-in. choke, T.D. 2,260 ft.

**Guadalupe County**

Darst Creek field: J. E. Clark 2 Posey, 10 bbl. oil and 290 bbl. sulfur water, T.D. 2,621 ft.
Wildcat: J. A. Forrester 1 B. B. Dix, dry, T.D. 2,367 ft.

**Gonzales County**

Wildcat: Pat O'Day 1 Dubose, dry, T.D. 1,509 ft.

### SOUTHWEST TEXAS DRILLING REPORT

**Aransas County**

Bay-Tex Oil Corp. and Atlantic 2 McCulloch, deep test NE flank McCampbell field, 7-in. casing 9,093 ft., drilling plug.

**Burleson County**

Haven Oil Co. et al 1 G. Lewis, C. H. Bennett Sur., drilling 3,925 ft.

**Calhoun County**

Moore & Ahern 1 J. B. Moore & Innis, Miguel Castillo Sur., T.D. 6,050 ft., twisted off drill stem, plug back to sidetrack.

**Duval County**

Henderson Coquat 1 Garcia, Sejita area, drilling shale 4,097 ft.
L. A. Douglas et al 1 Clara Driscoll, Santa Rosalia grant, drilling 1,910 ft.
Sun 1 Black, James House Sur. 6, T.D. 4,607 ft., dry.

**Goliad County**

W. R. Davis 2-C Albrecht, Weser field, coring 3,074 ft.

**La Salle County**

Barnsdall 1 G. W. Sager, Sur. 903, drilling shale 2,527 ft.

**McMullen County**

Crown Central 1 Dolan, S.D. 3,400 ft.

**Victoria County**

N. Newton Rayzor 1 Evertson, B. Simms Sur., drilling shale 2,200 ft.

# Drilling Gains in Southwest Despite Lack of Outlets

By
ROBERT INGRAM

As field development and exploration picked up markedly this week, the southwestern part of the state came to the fore, partly as a reflection of recent development across the Red River in Texas. Wildcats were drilling in Jackson, Tillman and Cotton counties (see drilling report below) and the Altus area of Jackson County, which has been active for some months, appeared due for even further development.

There were eight active operations in the Altus and Boucher fields, and a new spurt of activity was expected to follow the recording of a block of oil and gas leases in the Duke Township, Range 2n-23w, most of which was turned to C. C. Harwell, Tulsa. The new leases totaled 2,680 acres. Production at Altus comes from shallow zones at 1,200-1,500 ft., and has attracted a number of independent operators.

The entire southwestern part of the state, however, is at present lacking in sufficient outlets for crude. This condition applies at the Hobart pool in Kiowa County also where Stanolind Crude Purchasing Co. last week confirmed reports that it would discontinue purchases of crude oil in the Hobart field on April 1. No cause was assigned.

The company has been buying from Sherman et al, who operate a gathering system in the field and make deliveries by truck to a loading rack near Komalty. Sherman now is constructing a line from the field to a rail loading rack near Hobart and was due to start runs sometime this week.

### Phillips Runs Own Oil

Phillips Petroleum Co., which also has considerable holdings in the Hobart area, is running its own oil from the field, handling it through a line to a loading rack near Hobart. It was not revealed whether Phillips would take over the connections cut off by the Stanolind.

Discovered 2 years ago, the field got its first outlet last November and since that time about 700 cars of crude have been shipped. Even so most of the companies are underproduced because of the inability to move the oil. Apparently the inadequate outlet was not holding back field work, however, as a number of active operations continued, and limits of the Hobart field were gradually being defined.

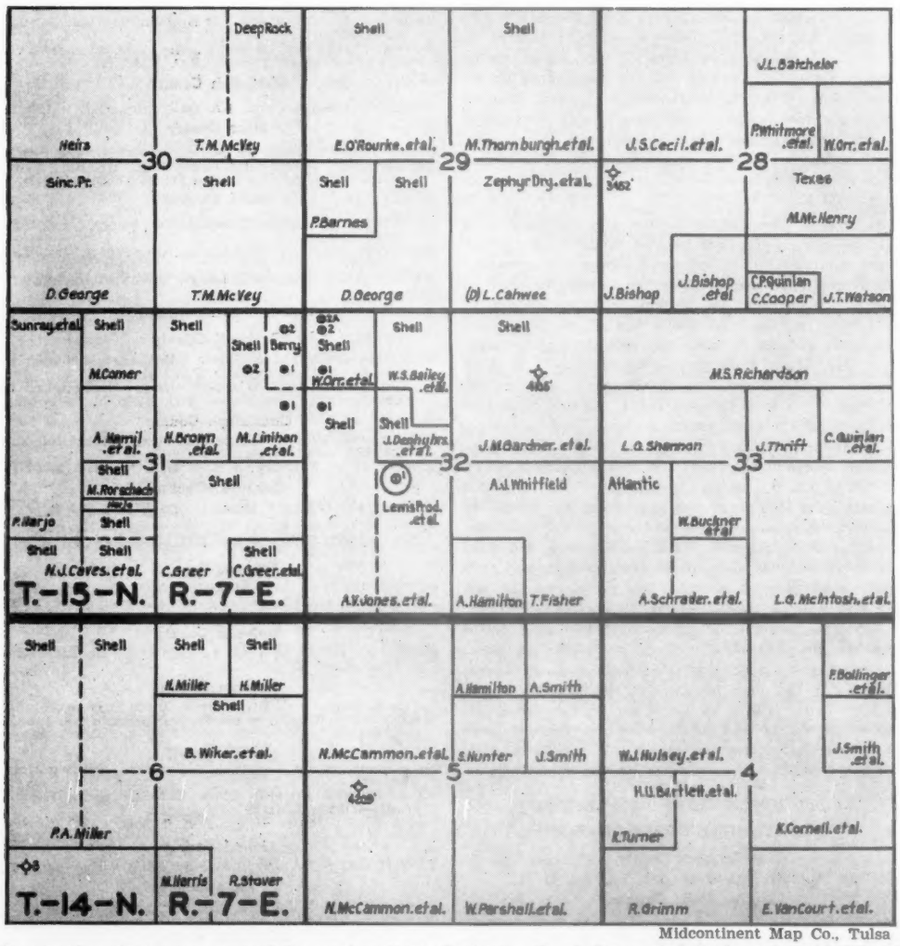
At week's end, Lewis & Meyer were expected to define the pool on the west at 1 Mitchell, NW NW SE 19-7-17w. The well was drilling at 1,340 ft., possibly in Hunton lime, and bailing a half bailer of fluid an hour. At 1,310 ft. the well was acidized and some of the fluid recovered after that had an acid taste. There was only a show of oil.

And at the north end, Argo Oil Co. 3 Ratliff seemed to have found the end of production in that direction. The well, in NE NE NE 19-7-17w, had its first show of oil at 1,020 ft. and had 30 ft. of oil in the hole at 1,024 ft. where pipe was to be set before drilling deeper. This well was checking 101 ft. lower than the 1 Ratliff and 73 ft. lower than 2 Ratliff, but there was no water showing.

### SUMMARY OF COMPLETIONS

| | No. | Bbl. | Footage |
|---|---|---|---|
| Oil wells: Cumberland | 2 | 510 | 10,168 |
| Dill | 2 | 532 | 7,268 |
| St. Louis | 2 | 390 | 7,519 |
| West Hewitt | 2 | 900 | 4,141 |
| Other fields | 6 | 1,003 | 20,519 |
| Wildcats | 1 | 151 | 4,010 |
| Gas wells: Chickasha | 1 | *147 | 4,526 |
| Other fields | 3 | *120 | 5,244 |
| Dry holes: Dill | 2 | ..... | 7,474 |
| Other fields | 5 | ..... | 10,854 |
| Wildcats | 6 | ..... | 26,503 |
| Total | 32 | ..... | 108,226 |
| Recompletions | 3 | 66 | ..... |

*Million cu. ft.




Midcontinent Map Co., Tulsa

***Prue sand production was opened this week at Lewis Production Co. 1 Jones, circled above in NW NE SW 32-15-7, in the East Stroud area of Creek County, a new pool. The well went to 4,102 ft. for dry sand, then plugged back to 2,850 ft. and shot at 2,808 ft. in the Prue***

### AVERAGE DAILY PRODUCTION
#### LEADING OKLAHOMA FIELDS

| | Mar. 29 | Mar. 22 |
|---|---|---|
| Allen | 4,700 | 4,650 |
| Billings | 6,225 | 6,200 |
| Burbank | 7,575 | 7,350 |
| South Burbank | 7,550 | 7,450 |
| Balance Osage | 16,975 | 16,250 |
| Blackwell district | 3,625 | 3,300 |
| Bristow-Slick | 6,375 | 6,300 |
| Chandler | 1,025 | 1,025 |
| Crescent | 1,925 | 1,975 |
| East Cromwell | 3,025 | 3,025 |
| Cromwell | 2,925 | 2,925 |
| Cumberland | 6,150 | 6,100 |
| Cushing-Shamrock | 8,850 | 8,825 |
| Dill | 6,550 | 6,500 |
| Duncan | 3,650 | 3,600 |
| Edmond | 3,500 | 3,525 |
| Fish | 2,650 | 2,625 |
| Fitts | 12,700 | 12,100 |
| Jesse | 2,075 | 1,875 |
| Graham-Fox | 2,175 | 2,125 |
| Healdton | 8,600 | 8,625 |
| Hewitt | 8,350 | 8,050 |
| Keokuk | 2,875 | 2,825 |
| Konawa | 975 | 950 |
| Lucien | 5,650 | 5,675 |
| Moore | 1,025 | 1,025 |
| Northeastern counties | 17,200 | 16,950 |
| Oklahoma City | 90,700 | 93,350 |
| Olympic | 1,750 | 1,725 |
| Ramsey | 3,525 | 3,525 |
| Sasawka | 1,325 | 1,325 |
| Sholem-Alechem | 2,550 | 2,600 |
| Seminole district: | | |
| Bowlegs | 6,375 | 6,275 |
| Carr City | 2,425 | 2,325 |
| Dora | 1,250 | 1,250 |
| Earlsboro | 3,950 | 3,925 |
| East Earlsboro | 1,650 | 1,650 |
| South Earlsboro | 475 | 450 |
| Little River | 6,450 | 6,325 |
| East Little River | 650 | 650 |
| Mission | 1,375 | 1,250 |
| Seminole | 6,450 | 6,425 |
| East Seminole | 975 | 950 |
| Searight | 1,875 | 1,750 |
| Total Seminole | 33,900 | 33,225 |
| St. Louis-Pearson | 19,275 | 19,250 |
| Tatums-Tussy | 5,775 | 5,525 |
| Tonkawa-Garber-Thomas | 3,575 | 3,550 |
| Wewoka | 1,725 | 1,675 |
| Yale-Jennings | 3,250 | 3,225 |
| Total Oklahoma | 409,250 | 402,150 |

### Other Sectors Show Gains

Although the southwestern part of the state showed a marked gain in activity, it was not the only area picking up. The Dill pool and the entire Okfuskee County region continued busy, two locations were starting last week to test the limits of the new Guthrie pool in northeastern Logan County on the west and the south, Prue sand production was opened by Lewis Production Co. 1 Jones in the East Stroud area of Creek County (see map) and Osage County leases

*(Continued on Page 111)*

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# Rapid Development of Cooke County Strike Is Expected

By
R. MARNE SANFORD

WICHITA FALLS, Tex., Mar. 31.—The Blue Grove area of Clay County will receive another deep wildcat test by Bridwell Oil Co., Wichita Falls The company has just abandoned one deep Ellenburger failure in the area and the new site is about 6,000 ft. northeast. It is 2 Myers, 3,350 ft. from west line and 2,195 ft. from the north line of the Thompson Survey. The company's 1 Myers, same survey, topped the Ellenburger lime at 6,038 ft. and found slight shows from 6,057-59 ft. but was quit at a total depth of 6,065 ft. The Mississippi lime was topped at 5,997 ft. and slight shows were found from 6,020-26 ft. The new wildcat is primarily projected to the Caddo lime, but will be carried deeper to test the Mississippian and Ellenburger should the Caddo prove barren.

*COLEMAN AREA.*—Meanwhile, in Clay County, a Mississippian lime discovery is still testing for completion. It is Shell 1-A Coleman, Section 4, Calhoun C.S.L. Survey, 8 miles southeast of Henrietta. The well showed for a producer in the Mississippian lime but was drilled ahead to test the Ellenburger lime. As the past week closed the test was bottomed at 6,837 ft., with a tentative top of the Ellenburger lime called at 6,727 ft. Bailing tests were under way; however, it is expected that the company will plug back and complete from the Mississippian level.

Shell Oil Co. is also launching a developmental program on a Coleman tract in Archer County. The Archer County area is productive from the Caddo lime of Bend series and is about 4 miles northwest of the town of Scotland in the southeastern part of the county. Shell has staked two outpost tests to the one-well field, opened by 1-B Coleman, discovery well. No. 2-B Coleman is a 3,500-ft. location 330 ft. from the south and west lines of a 36-acre tract and 660 ft. west of the discovery well. No. 3-B Coleman is 330 ft. from the north and east lines of the same tract and 660 ft. north of the discovery well. All locations, as well as the discovery producer, are located in Lot 1, Section 74, A.T.N.C.L. Survey.

## SUMMARY OF COMPLETIONS

*North Texas*

| | No. | Bbl. | Footage |
|---|---|---|---|
| Oil: Hull-Silk field | 3 | 1,340 | 12,559 |
| Voth field | 2 | 275 | 2,403 |
| K.M.A. field | 4 | 940 | 13,510 |
| Olney field | 3 | 331 | 2,770 |
| Other fields | 11 | 2,542 | 33,427 |
| Dry: Olney field | 7 | ..... | 5,889 |
| Other fields | 9 | ..... | 21,110 |
| Wildcats | 5 | ..... | 10,997 |
| Total | 44 | ..... | 102,665 |

*West Central Texas*

| | | | |
|---|---|---|---|
| Oil: Jones County fields | 2 | 975 | 5,157 |
| Shackelford County fields | 3 | 30 | 2,608 |
| View field | 1 | 114 | 2,403 |
| Carbon field | 1 | 125 | 2,658 |
| Novice field | 1 | 256 | 3,595 |
| Dry: Fields | 1 | ..... | 903 |
| Wildcats | 2 | ..... | 2,529 |
| Total | 11 | ..... | 19,853 |

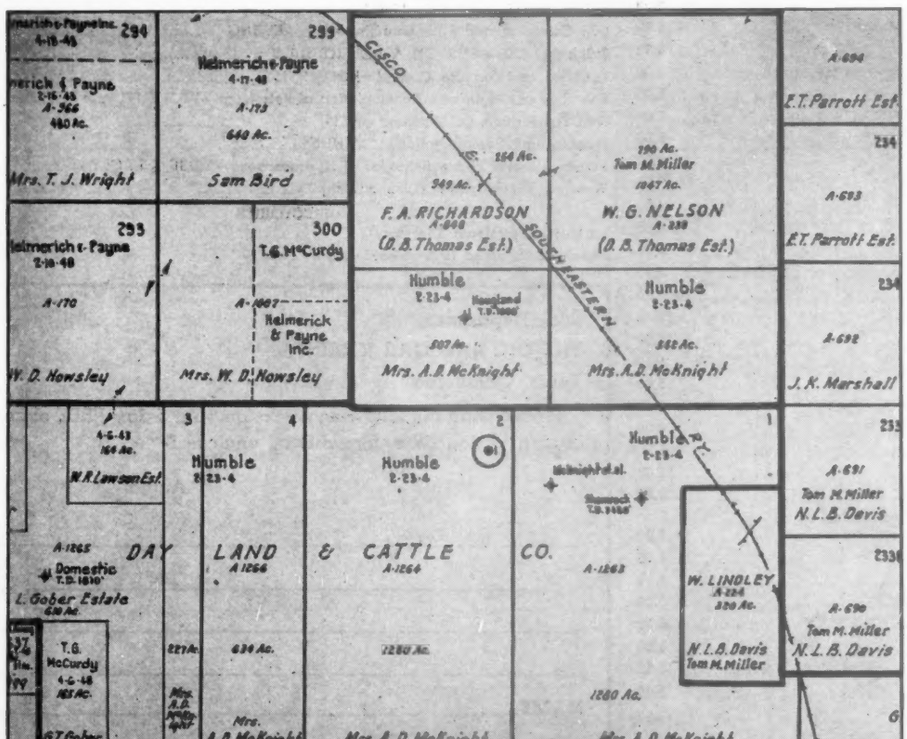
## New Wildcats Started

*PARKER COUNTY.*—Parker County was given a new deep wildcat location in an area where the same operator only a few weeks ago abandoned a deep 4,840-ft. wildcat. Test is to be J. L. Higginbotham 1 Wheeler, J. B. Vrannon Survey, ¾ mile northeast of the operator's 1 Ella Gilbert, G.W.T.&P. Survey, near Lipan, which was quit after showing oil at 3,800 ft., 4,140 ft., 4,460 ft., and around 4,800 ft. The last zone also showed considerable gas. The recently abandoned failure was started about 4 years ago by Brown & Gardner and was taken over a year ago by Higgenbotham at the 4,000-ft. level. The first exploratory hole was reported quit when gas blew pipe up the hole and caused operator to junk the hole.

*SEYMOUR FIELD.*—Closely following the acquisition last week by British American Oil Producing Co. of several thousand additional acres out of the Paul Cowan ranch north of the Seymour field in Baylor County, comes the report that Sinclair Prairie Oil Co. will enter the field's development with a proposed test between the field proper and the 2-mile north extension recently completed by British American. Sinclair Prairie will drill 1 J. H. Turbeville, NE Section 205, T.&N.O. Survey, a 2,600-ft. test. The tract adjoins on the north acreage held by British American on which locations have been staked.

## Development Seen for Cooke Strike

About 10 days ago Texas Co. cemented casing and prepared to complete a new 1,900-ft. discovery well in northwestern Cooke County. During the past week the company staked location for another test in the area and was surveying for several more locations to be made in the near future. The location is 1 W. H. Andres, 330 ft. from the north and west lines of Lot 4, Francis Hughes Survey, Abstract 439, about ½ mile south of the prospective discovery well. Meanwhile, pumping equipment was being rigged up at the 1 Bindel, Section 1, Hughes Survey, after the well swabbed 85 bbl. of oil in 16 hours from sand from 1,885-96 ft. A flowing well was thought probable prior to drilling plug. The well was drilled on short-term leases and rapid development of the acreage is expected.




Southwest Mapping Co., Fort Worth

***Throckmorton County has been given a new deep Caddo lime discovery well at Humble 1 McKnight, NE cor. Section 2, D.L.&C. Survey, just about 3 miles northwest of an old Caddo lime field discovered by the company about 15 years ago. The well, circled above, has been completed for 1,488 bbl. daily from 4,021-52 ft.***

## NORTH TEXAS COMPLETIONS

### Archer County

Archer field: Panhandle Oil 1 Colgan, dry at 1,602 ft.
Home Oil 4 Meade, abandoned location.
Home Oil 5 Meade, abandoned location.
Burma Oil 1 Lemmons, dry at 1,350 ft.
W. R. Worthington 3 McLeland, 15 bbl. daily, pumping, 1,184-90 ft.
C. T. Hedges 18 Harmell C, 8 bbl. daily, 6-qt. shot. 1,267-77 ft.
E. P. Bowen 1 Portwood, dry at 1,476 ft.
Hull-Silk field: Petroleum Prod. 3 Johnson A, 42 bbl. an hr., ¾-in. choke, 220-qt. shot, est. 575 bbl. daily, 4,305-84 ft.
Blackwell Oil & Gas 12 Wilson, 44 bbl. in 1 hr., ¾-in. choke, est. 275 bbl. daily, 1,000 gal. acid, 3,963-90 ft.
J. A. Chapman 1 Wilson, 46 bbl. an hr., ¾-in. choke, 30-qt. shot, est. 490 bbl. daily, 3,783-90 ft.
Griffin field: Deep Oil Dev. 1 Griffin, 88 bbl. in 3 hr., ¾-in. choke, est. 60-qt. shot, 4,374-85 ft.
South Mankins field: British American 4 Parkey, abandoned location.

### Baylor County

Seymour field: British American Oil 2 Cowan, 104 bbl. oil and 965 bbl. water, pumping and flowing, daily, 1,000 gal. acid, 2,534-47 ft.
Wildcat: Hattie B. Madden 2 James, Sec. 150, T.&N.O. Sur., dry at 2,317 ft.

### Clay County

Antelope field: Shell 2 Wright, 162 bbl. in 8 hr., 2-in. casing outlet, natural, est. 300 bbl. daily, 3,167-3,216 ft.

### Cooke County

T.C.U. field: C. & L. Oil 20 Perkins, 20 bbl. daily, pumping, natural, 754-757 ft. and 762-778 ft.
Voth field: High Point Oil 1 Fette, 47 bbl. in 8 hr., pumping, natural, est. 100 bbl. daily, 1,091-99 ft.
Harvey Drlg. Co. 4 Sicking, 46 bbl. in 4 hr., pumping, natural, est. 175 bbl. daily, 1,291-1,304 ft.

### Jack County

Wildcat: Continental Oil 1 Johnson, D. D. Bruton Sur., Abst. 1671, top Caddo 4,415 ft., Marble Falls 4,897 ft., Ellenburger 5,497 ft., dry at 5,526 ft., no shows.

### Montague County

Rogers & Rogers field: Rogers & Rogers 6 Astley, 166 bbl. in 3 hr., ¾-in. choke, natural, est. 700 bbl. daily, 5,284-5,300 ft.
Stanolind 2 Hill, top Caddo 5,204 ft., Ellenburger 5,377 ft., dry at 5,440 ft.

### Wichita County

Wichita field: McElreath & Suggett 1 Turner, dry at 1,244 ft.
Bridwell Oil 1 Parker, dry at 1,825 ft.

K.M.A. field: Golding & Cochran 9 Preston, 57 bbl. in 3 hr., ¾-in. choke, est. 290 bbl. daily, 3,932-56 ft.
Shell & Phillips 15 Preston A, 89 bbl. in 3 hr., ¾-in choke, 182-qt. shot, est. 325 bbl. daily, 3,890-3,964 ft.
Perry Browning 1 Simpson, 75 bbl. daily, pumping, 1,760-65 ft.
Tide Water 22 Ferguson, 56 bbl. in 3 hr., ½-in. choke, est. 250 bbl. daily, 300-qt. shot, 3,722-3,825 ft.
Wildcat: R. H. Larsen 1 Karrenbrock, J. Aldredge Sur., Abst. 4, dry at 675 ft.

**Wilbarger County**

Wilbarger field: Christie-Hickman Drlg. Co. 3 Waggoner, dry at 1,949 ft.
W. B. Omohundro 2 Waggoner, dry at 2,218 ft.
Shaty-Wynne 22-G Waggoner, 95 bbl. daily, pumping, 2,428-33 ft.
Fargo field: Amerada 1 Goodpasture B, 76 bbl. in 3 hr., ⅛-in. choke, est. 375 bbl. daily, 3,971-4,011 ft.
Harrold field: Amerada 1 Harrold, 126 bbl. in 3 hr., ⅛-in. choke, 290-qt. shot from 4,410-66 ft. and 4,498-4,578 ft., 5,000 gal. acid from 3,924-48 ft., T.D. 4,593 ft., P.B. to 4,323 ft.
Wildcat: Ray Bros. 1 Streit, S. N. Gosnel Sur., Abst. 1231, junked and quit at T.D. of 2,278 ft.

**Young County**

Olney field: C. J. Bohner 1 Prideaux, dry at 511 ft.
Kimmell, Lee & Co. 5 Campbell B, 38 bbl. in 6 hr., natural, est. 85 bbl. daily, 854-975 ft.
J. W. Sparks 8 Clark, dry at 932 ft.
P. B. Worthington 6 Clark, dry at 949 ft.
P. B. Worthington 4 Rogers, dry at 902 ft.
L. T. Burns 7 Rogers, 70 bbl. in 8 hr., pumping, est. 150 bbl. daily, 886-897 ft.
Burns 8 Rogers, 96 bbl. daily, pumping, 886-898 ft.
J. T. Harrell 2 Rogers A, dry at 934 ft.
Horwitz & Oldom 18 Graham, dry at 680 ft.
Young field: Falcon Oil 1 Turner, dry at 4,006 ft.
W. Gant 1 Simms, 75 bbl. daily, natural, 3,693-97 ft.
Wildcats: B. T. Meyer 3 Calvin, J. T. Bussy Sur., Abst. 2152, abandoned location.
Mason & Hibbs 1 Leberman, Sec. 271, T.E.&L. Sur., dry at 201 ft.

## NORTH TEXAS WILDCAT REPORT

**Archer County**

W. B. Hamilton 22 Cartwright, 660 ft. from W and S lines, James Webb Sur., Abst. 664, T.D. 5,211 ft., P.B. 5,164 ft., 60-qt. shot 5,149-61 ft., swabbing and cleaning out, est. 30 bbl. oil daily, S.D. 5,211 ft.
Walter Gant 1 Hunter, SE NW Sec. 7, Blk. 1, H.&T.C Sur., top Ellenburger 5,370 ft., T.D. 5,391 ft., cemented back 5,120 ft., tested after 10-day shutin, made 40 bbl. oil first hr. and 19 bbl. second hr., then well went dead.
King Oil 1 Taylor, Lot 1, Sec. 13, A.T.N.C.L. Sur., top Ellenburger 4,963 ft., T.D. 5,055 ft., shot off pipe with 70-qt. shot from 4,927-44 ft., pumped 59 bbl. in 16 hr. and pumped off, est. 20 to 30-bbl. well, waiting on test.
W. B. Hamilton 1 C. E. Graham, C SE part of Gibenrath Sur., Abst. 136, 2,000-ft. test, S.D. 1,975 ft., prepare to drill deeper.
Magnolia 1 Hayton, SE SE SE Sec. 2415, T.E.&L. Sur., 5,400-ft. test, top Caddo 4,660 ft., Marble Falls 4,765 ft., drilling 5,057 ft.

**Baylor County**

Rogers & Lanfair 1 Howe, J. Howe Sur., Abst. 572, show oil 1,445-52 ft., S.D. 3,115 ft., T.D., may drill deeper.
Baldwin & Reed 1 Robertson, 3,600 ft. from N and 630 ft. from E lines Robertson C.S.L. Sur., Abst. 280, drilling 3,052 ft.
Amerada 1 Upshur County Sch. Lds., 6,175 ft. from N and 11,250 ft. from E lines Lot 58, Upshur C.S.L. Sur., Abst. 557, first report, 6,000-ft. test.

**Clay County**

Bridwell Oil 1 W. H. Myers, C. Thompson Sur., Abst. 444, top Caddo 5,486 ft., drilling 5,943 ft.
Gulf 1 C. W. Scaling, NW NW Sec. 31, T.&N.O. Sur., Abst. 685, 6,000-ft. test, drilling 5,197 ft.
L. T. Burns 1 Southerland, NE cor. of 100 acres of Sec. 63, J. H. Belcher Sur., 5,500-ft. test, top Caddo 5,322 ft., T.D. 5,340 ft.
L. W. Stanford 1-A Edrington, 8,689 ft. from S and 150 ft. from E lines of F. W. Grassmyer Sur., Abst. 694, 1,200-ft. test, S.D. repair 700 ft.
George Graham 1 Hansard, 1,736 ft. from N and 914 ft. from W lines of lease in Thornberry subd., 1,250-ft. test, show oil 400-22 ft., installing pump to complete, T.D. 1,144 ft.
L. T. Burns 1 Fred Wines, 593 ft. from N and 476 ft. from E lines of Sec. 1, Halsell subd. 1, 5,500-ft. test, derrick.
George Graham 2 Hansard, 1,736 ft. from NW and 614 ft. from SW lines Sec. 8, Thornberry subd., 300 ft. SW of No. 1 well, 1,150-ft. test, 7-in. at 1,122 ft., T.D. 1,135 ft., show oil.
Shell 1 Coleman, Sec. 24, Calhoun C.S.L. Sur., show oil in Mississippian lime, top Simpson 6,455 ft., Ellenburger 6,727 ft., drilling 6,830 ft.

**Cooke County**

Texas Co. 1 Bindel, 1,530 ft. from N and 330 ft. from W lines of Francis Hughes Sur., Abst. 439, 3,000-ft. test, show oil 1,885-96 ft., completed for 234 bbl. daily, pumping.
Gill & Sitherspoon 5 Wilson, 1,950 ft. from W and 3,500 ft. from N lines, Ehen Reed Sur., Abst. 849, 1,100-ft test, first report.

**Hood County**

Aztec Oil 1 Gallagher, SW SE Robert Alway Sur., 3,000-ft. test, S.D. orders 2,200 ft.

**Jack County**

Continental 1 Robertson, M. J. Swan Sur., Abst. 1659, top Ordovician 5,380 ft., T.D. 5,577 ft., P.B. 5,514 ft., swabbing est. 50 bbl. oil per 7 hr. but will not flow, still testing.
R. J. Conkling 1 M. Hoffle, A. James Sur., Abst. 318, 3 mi. S of Antelope, 3,500-ft. test, T.D. 3,128 ft., S.D. repair 3,165 ft.
K. N. Davis 1 Jones, NW cor. E½ Sec. 2555, T.E.&L. Sur., 1 mi. SE Perrin, 2,500-ft. test, moving in rig.
Harper-McClintock 1 Kinder, 1,400 ft. from E and 467 ft. from N lines, Sec. 2667, T.E.&L. Sur., 6⅝-in. casing 1,640 ft., drilling 1,910 ft.
O. J. Perrin 1 Brumbelow, 1,045 ft. from S and 720 ft. from E lines, H. C. Ayers Sur., Abst. 4, S.D. 3,505 ft. after electrical survey.
Reed & Craft 1 Richards, 467 ft. from W and 1,200 ft. from N lines of C. Gates Sur., Abst. 237, 3,500-ft. test, digging pits.
C. H. Peterson 1 Hoefle, SE cor. John W. Barrett Sur., Abst. 48, 500-ft. test, 8-in. at 228 ft., 7-in. at 325 ft., show oil 340-42 ft., 438-44 ft., T.D. 444 ft.
Adam Grafe 1 H. R. Bloodworth, 6,986 ft. from S and 3,244 ft. from N lines, William McDonald Sur., Abst. 380, 3,500-ft. test, moved in material and S.D.
P. B. Worthington (was R. S. Lake) 1 Simpson, 1,500 ft. from S and 1,000 ft. from W lines J. W. Abbey Sur., Abst. 11, old well drilled deeper, old T.D. 3,152 ft.

**Montague County**

Seitz, Comegys & Seitz 1 Ritchey, NE cor. S½ Sec. 60, Belcher subd., 6,200-ft. test, 10¾-in. 826 ft., drilling 880 ft.
Walter Gant 1 Will Laird, R. T. Millard Sur., Abst. 470, 7 mi. W of Sunset, T.D. 6,651 ft., P.B. to 6,596 ft., perf. casing 4,865-73 ft., best gage for 125 bbl., swabbing in 6 hr. after S.I. for 10 days, rotary moved off, may plug back again and test Strawn series oil shows.
T. F. Hunter and Wilcox O. & G. 1 Barcas, SE Sec. 78, Kaufman C.S.L. Sur., Abst. 407, T.D. 4,705 ft., cemented back to 4,383 ft.
Redman Brothers 1 Hardy, 225 ft. from N and E lines of 41-acre tract in Fielding Secrest Sur., Abst. 665, 2,500-ft. test, drill pipe stuck, circulating to free at 2,447 ft.
Benson & Benson 1 Seay, SE SE SE Sec. 31, Blk. 4, H.&T.C. Sur., 4,000-ft. test, 10-in. 500 ft., drilling 1,364 ft.
Sinclair Prairie 1 Clingingsmith, 467 ft. from S and W lines of Sec. 149, Jose Olabarri Sur., Abst. 579, 6,000-ft. test, 9⅝-in. at 749 ft., drilling 3,905 ft.

**Throckmorton County**

Rathke Oil 1 Swagerty, 495 ft. from N and 746 ft. from E lines of SW Sec. 258, B.B.B.&C. Sur., 5,000-ft. cable-tool test, drilling 2,128 ft.
Humble 1 Allie McKnight, 1,100 ft. from N and 600 ft. from E lines, Sec. 2, D.L.&C. Sur., Abst. 1264, 5,000-ft. test, top Caddo 4,021 ft., show oil 4,028-42 ft., T.D. 4,049 ft., completed for 1,488 bbl. a day.

**Wilbarger County**

O. H. Hammer 1 A. V. Shelton, NW NW Sec. 16, Blk. 11, H.&T.C. Sur., 4,500-ft. test, drilling 125 ft.
W. H. Gant 1 Mock, Sec. 23, Blk. 11, H.&T.C. Sur., 6,000-ft. test, drilling 6,113 ft.
S. S. Kouri and W. B. Omohundro 1 Kelly, 467 ft. from S and W lines of Sec. 54, Blk. 13, H.&T.C. Sur., 4,000-ft. test, 10-in. at 85 ft., drilling 3,120 ft.
W. B. Omohundro 1 Vaughn, 2,330 ft. from E and 330 ft. from N lines, S½ Sec. 29, Blk. 1-C, H.&T.C. Sur., 5,000-ft. test, first report.
Wilcox Oil & Gas 1 Waggoner, 330 ft. from S and E lines, SW Sec. 43, Blk. 2, H.&T.C. Sur., 5,000-ft. test, first report.

**Wise County**

Manahan Oil 1 E. R. Collier, J. M. Wade Sur., Abst. 868, corrected depth 7,500 ft., prepare to drill ahead below 6,047 ft., repairing rig.

**Young County**

Ben H. Rankin 1 Mary Logan, SW part Blk. 2, J. W. Doty Sur., 8 mi. NE Graham, 2 mi. W Nelson field, tested 1,000,000 cu. ft. gas from 4,288-95 ft., top Marble Falls 4,470 ft., S.D. 4,475 ft.
Dorian & Farrell 1 Grigsby, Sec. 416, T.E.&L. Sur., 7-in. 3,972 ft., show oil 3,979-89 ft., bailed 1½ gal. oil per hr., T.D. 4,991 ft., P.B. 3,989 ft., 40-qt. shot, made 3 bbl. in 1½ hr., testing.
Frank Buttram 1 Holmes, 600 ft. from W and 1,960 ft. from S lines, J. M. McRodgers Sur., Abst. 1878, show gas 4,006-11 ft., T.D. 4,065 ft., treated 7,000 gal., acid, no results, P.B. 4,050 ft.
L. T. Burns 1 Larimore A, 500 ft. from N and W lines of E 200 acres of Sec. 150, T.E.&L. Sur., 5,200-ft. test, rigging up rotary.
E. L. Orr 1 Laird, 150 ft. from S and 1,450 ft. from W lines, Sec. 1393, T.E.&L. Sur., 925-ft. test, first report.

## WEST CENTRAL TEXAS

FORT WORTH, Tex., Mar. 31.—The discovery oil well in Throckmorton County by Humble Oil & Refining Co. was officially gaged as one of the most promising new discoveries in the district in several years. It is 1 McKnight, Block 2, D.L.&C. Survey, about 6 miles southeast of the town of Throckmorton. Official gage was 1,488 bbl. in 24 hours, flowing, after a 5,000-gal. acid treatment.

The discovery is producing from a 31-ft. section of saturated Caddo lime from 4,021-52 ft. The discovery is approximately 3 miles northwest of an old Caddo lime field opened by the company 15 years ago but which is almost depleted at the present time.

*CALLAHAN COUNTY.*—Yates & York have staked 1 Huestis, a shallow 600-ft. cable-tool test 150 ft. from the east and 450 ft. from the north lines of NW Section 3198, T.E.&L. Survey, Callahan County.

*COLEMAN COUNTY.*—West Central Production Corp. has located 1 Morris, 467 ft. from the south and west lines of the NE 160 acres of the J. Greenwood Survey No. 304. Also L. J. Derrick 1 Vance, a previously announced location for the county, is being prepared for drilling. It is a 3,000-ft. cable-tool test located 2,100 ft. from the east and 630 ft. from the south lines of Section 101, E.T. Survey.

*SHACKELFORD COUNTY.*—Cecil Young 2 Simpson, 630 ft. from the east and 2,390 ft. from the south lines of the W½ Section 13, B.A.L. Survey, is a location for a shallow 900-ft. cable-tool test.

## WEST CENTRAL TEXAS COMPLETIONS

**Coleman County**

Novice field: Robert McKissick 1 Ownes, 128 bbl. in 12 hr., 3,589-95 ft.

**Eastland County**

Carbon field: G. A. White 1 Pierce, 125 bbl. daily, 330-qt. shot, 2,580-2,658 ft.

**Jones County**

Wildcat: H. C. Hunter 2 Minter, Lot 7, Sec. 192, Robert Smith Sur., dry 2,358 ft.
Akard field: Hendrick Oil 1 Akard E, 196 bbl. in 12 hr., 2,122-41 ft.
Noodle-Swastika Extension field: Humble 1-B Huddleston, 320 bbl. in 10 hr., ¾-in. choke, 3,003-16 ft.

**Shackelford County**

Nail field: Whittmer Oil & Gas 2 Nail, 15 bbl. daily, pumping, 1,381-90 ft.
Ghio field: J. P. Roy 2 Ghio-Harbough, 5 bbl. daily, pumping, 590-594 ft.
J. P. Roy 3 Ghio-Harbough, abandoned location.
Cooke field: C. G. McCamey & Nail 1 Cook, dry at 903 ft.
Albany field: Stanfield & Tubbs 3 Clark, 10 bbl. daily, pumping, 614-624 ft.
Wildcat: Stewart & Ethert 1 Gray, Sec. 84, University Sur., dry at 171 ft.

**Taylor County**

View field: Ungren & Frazier 1 Langford, abandoned location.
S. & B. Oil 1 Richards, 114 bbl. daily, ½-in. choke, 1,500-gal. acid, perf. casing 2,356-61 ft. and 2,398-2,403 ft., T.D.

## WEST CENTRAL TEXAS WILDCAT REPORT

**Brown County**

C. G. Goss 1 Crownover, 467 ft. from S and E lines Sec. 26, B.B.B.&C. Sur., 3,000-ft. test, rigging up spudder.
R. Richmond 1 Petros, SW SW Sec. 7, H.T.&B. Sur., 1,200-ft. test, S.D. 800 ft.
Manning, Richburg & Johnson 3 Charter, SE NW Sec. 19, Blk. 2, B.B.B.&C. Sur., 600-ft. test, location.
Central Tex. Gas 1 E. S. Smith, NE cor. of W 199 acres of S 291 acres of Wm. Guyman Sur. 86, 2,000-ft. test, moving in material.
H. P. Evans 1 Starkey, SE SE Sec. 3, H. C. Walker Sur., 1,200-ft. test, S.D. 150 ft.

**Callahan County**

W. D. Austin 1 I. N. Jackson, 150 ft. from N and W lines, Sec. 2, C.&M. Sur., drilling 940 ft.
Reeves & Sorrell 1 Young, 1,980 ft. from N and 660 ft. from E lines, Sec. 37, B.B.B.&C. Sur., H.F.W. 1,975-2,000 ft., 6⅝-in. 2,000 ft., S.D.
Ungren & Frazier 1 Rushing, SE SE SE Sec. 116, B.B. B.&C. Sur., 1,500-ft. test, drilling 810 ft.
Yates & York 1 Huestis, NE NW Sec. 3198, T.E.&L. Sur., 600-ft. test, first report.

**Coleman County**

L. J. Derrick 1 J. W. Vance, 330 ft. NW of old Texas 1 Vance, also in Sec. 101, E.T. Sur., spudding on 3,000-ft contract.
R. H. Murray 1 Morris, 467 ft. S and W of NE 160 acres of J. Greenwood Sur. 304, cleaning out with spudder, T.D. 1,305 ft.
West Coast Prod. Corp. 1 Morris, SW cor. of NE 160 acres, J. Greenwood Sur. 304, first report.
Cooper Brothers 1 McClure, 1,100 ft. from S and 2,400 ft. from W lines of T. R. Frizzell Sur. 711, 2,800-ft. test, S.D. repairs 920 ft.
States Oil 1 Hudson, NW SW Sec. 22, Blk. 2, T.&N.O. Sur., 3,600-ft. test, location.

**Comanche County**

Campbell 1 Stark, SW part of Asa Hoxey Sur., S.D. 145 ft., repair, will set 6⅝-in.

**Concho County**

Floyd C. Dodson 1 Robert Wilson, Thomas Green Sur., 10 mi. SW Eden, show oil and gas 3,792-95 ft., 3,819-20 ft., at 3,828-29 ft. showed 1 bailer water per hr., correction, T.D. 3,829 ft., S.D.O.

**Eastland County**

Hickok Oil 1 Luse & Gray, NE Sec. 486, S.P. Sur., Ordovician test, ¾ mi. SE of new McElreath field, show gas 3,688-89 ft., tested 781,000 cu. ft. daily, T.D. 3,689 ft., testing.
Douglas Tomlinson, Jr., et al 1 Bennett, NE NE NE Sec. 6, Blk. 2, H.&T.C. Sur., 900-ft. test, T.D. 896 ft., est. 10 to 15 bbl. daily, testing on pump.
Arnold, Kirk et al 1 J. W. Adams, Jr., 2,708 ft. from N and 761 ft. from E lines David McFadden Sur., 2,600-ft. test, first report.

**Erath County**

W. A. Young 1 J. B. Mills, J. Harvey Sur., 5 mi. NW of Dublin, T.D. 212 ft., S.D.

**Fisher County**

General Crude Oil 12 Flanigan, center of old Royston field, drilling 6,604 ft., with 5,800 ft. of sulfur water in hole.
F. A. Stephenson 1 Humphries, NW NW Sec. 49, Blk. 1, T.T.&B. Sur., 2,350-ft. test, top lime 2,985 ft., dry lime 2,985-92 ft., T.D., waiting on spudder.
P. R. Long 1 W. F. Davidson, SE NW Sec. 59, Blk. 1, H.T.&B. Sur., 4,300-ft. test, S.D. 100 ft.
Landers & Eisele 1 Mose Newman, SE NW Sec. 8, Blk. 20, T.&P. Sur., 10-in. 301 ft., oil lime 3,416-34 ft., treated and tested only mud, 7-in. 3,414 ft., testing, T.D. 3,434 ft.
P. R. Long 1 Maberry, SE cor. A. A. Spring Sur., 2 mi. SW of McCaully, show oil 3,250-79 ft., waiting on spudder.

**Hamilton County**

A. J. Caldwell 1 W. W. Jones, 1,002 ft. from NE, 150 ft. from SE lines, W. H. Crowder Sur., correction, S.D. 2,999 ft.
Gunther & Smith 1 Thompson, 467 ft. from SE and 4,533 ft. from SW lines of Rhody Kennedy Sur., spudded and S.D.
Groover & Rose 1 Joe Fuqua, 1,600 ft. from W and 640 ft. from S lines of J. W. Bowers Sur., 3,000-ft. test, 13½-in. 310 ft., preparing to drill ahead.

**Jones County**

H. Hines and W. D. Brookover 1 A. N. Wimberly, SW SW Subd. 91, De Witt C.S.L. Sur., 2,500-ft. test, saturation 2,215-33 ft., installing pump, est. 50 bbl. oil per day, drilling deeper below 2,400 ft.
Danciger Oil & Ref. 1 Jacob Foster, SE¼ W 100 acres, SW½ Sec. 13, Blk. 13, T.&P. Sur., 3,000-ft. test, 8¾-in. at 1,782 ft., drilling 2,150 ft.

*(Continued on Page 109)*

By

R. MARNE SANFORD

# Drilling Operations Show Big Gain; Six Wildcats Start

MIDLAND, Tex., Mar. 31.—Showing a decided upturn in drilling activity, the West Texas district last week recorded a total of 45 new completions of which only one was a failure. There were also 73 new locations, of which six were in wildcat area. This record week closely follows the previous week's above-average high of 30 completions (only one being dry) and 46 new locations. Four of these 46 locations were in wildcat area which now gives the district a total of 10 new exploratory operations during the past 14 days.

The Wasson field of Yoakum County led with the greatest number of new locations, there being 16 staked. Ector County's several active fields accounted for 12 new starts. The Slaughter field received 14 locations with 11 of them being in Hockley County and 3 in Cochran County, and Pecos County received 10 locations.

The new wildcats for the week were one each in Ector, Andrews, Pecos and Ward counties, and two in Winkler County. Two wildcats had been staked the previous week in Borden County and one each in Pecos and Reagan counties.

*ECTOR COUNTY.*—In the southern part of Ector County M. D. O'Quinn has located 1 T.X.L., 2,173 ft. from the north line and 467 ft. from the east line of the W½ Section 31, Block 44, Township 3s, T.&P. Survey. It is about 1½ miles north of the Jordan field and 1½ miles east and slightly north of a failure drilled by Continental Oil Co. in Section 32 which was quit at 3,700 ft.

*ANDREWS COUNTY.*—The Mascho Oil Co. located 1 Fisher in the Schaffer Lake area of northwestern Andrews County. It is to be a 4,750-ft. operation and is located 1,980 ft. from the south line and 660 ft. from the east line of Section 16, Block 36-A, P.S.L. Survey. Hole had previously been spudded and rotary-drilling contract was let the past week. It is 1½ miles west of H. C. Wheeler 1 Fisher, quit after finding some free oil in the Permian lime section.

*PECOS COUNTY.*—In the Ordovician Abell field of northern Pecos County Eastland Oil Co. entered the play with the staking of a deep projected wildcat 1½ miles northeast of the discovery well. It is about ⅝ mile east of the George Abell 1 Rixse, a north outpost drilling well. Eastland Oil's location is 1 Simmons, 330 ft. from the south and west lines of Lot 12, Section 26, Block 9, H.&G.N. Survey.

*WARD COUNTY.*—Bells Wells Oil has staked a new location for a semiwildcat in the little-developed Hayes gas area of Ward County. The test is 1 Wilson, NW SW Section 133, Block 34, H.&T.C. Survey, just north of the original oil discovery completed years ago from the Delaware sand but later plugged as noncommercial. It is about 2 miles southeast of the large discovery gas well for the area a year ago and is also just ½ mile southeast of a test at present attempting completion from the Delaware sand. The completing well is Slack and associates 1 Wilson, SE cor. NE Section 145, Block 34, H.&T.C. Survey. It topped the Delaware lime at 4,998 ft. and encountered the Delaware sand at 5,030 ft., total depth being 5,034 ft. Some oil showed in the first 4 ft. of sand. However, casing will be cemented before taking more penetration.

*WINKLER COUNTY.*—The two Winkler County wildcats were one each in the Hendrick and the Halley areas. Stanolind, Westbrook & Thompson have located 1 Ida Hendrick, a 4,000-ft. test in the NW NW NW Section 18, Block 26, P.S.L. Survey. The other wildcat is Sam Weiner 1 S. M. Halley, NW NE Section 7, Block 11-B, P.S.L. Survey. Cellar and pits have been dug for this latter test and materials are being moved to the drill site.

Southwest Mapping Co., Fort Worth

***Another new location has been made in the Delaware producing Hayes gas field of Ward County. The field was opened by the southernmost well which made some oil before being quit as noncommercial several years ago. The second well was the large gas producer in the NE cor. of Section 148. A northeast offset to this well was quit as a failure recently, however, two tests are active between the old oil producer and the large gas well***

## SUMMARY OF COMPLETIONS

| | No. | Bbl. | Footage |
|---|---|---|---|
| ***Northern West Texas*** | | | |
| Oil: Slaughter field | 9 | 11,133 | 45,051 |
| Seminole field | 2 | 1,415 | 10,807 |
| Wasson field | 12 | 8,642 | 62,504 |
| Dockery-Robbins field | 2 | 480 | 3,497 |
| Other fields | 2 | 1,367 | 6,160 |
| Total | 27 | ........... | 128,019 |
| Old wells deepened | 1 | ........... | ........... |
| ***Southern West Texas*** | | | |
| Oil: McElroy field | 3 | 3,600 | 8,844 |
| Ector County fields | 4 | 3,744 | 17,188 |
| Pecos County fields | 3 | 313 | 4,178 |
| Other fields | 5 | 5,343 | 18,201 |
| Wildcat discovery | 1 | 36 | 5,665 |
| Dry: Pecos field | 1 | ........... | 1,463 |
| Total | 17 | ........... | 55,539 |
| ***Texas Panhandle*** | | | |
| Oil wells: Gray County | 5 | 698 | 15,516 |
| Hutchinson County | 5 | 1,603 | 14,767 |
| Total | 10 | ........... | 30,283 |
| ***Southeast New Mexico*** | | | |
| Oil wells: Eddy County | 1 | 150 | 2,665 |
| Gas wells: Lea County | 1 | *12 | 2,945 |
| Total | 2 | ........... | 5,610 |

*Million cu. ft.

## Crane County Discovery Gaged

Now being called a 4-mile-south extension to the southern part of the Sand Hills Ordovician field in Crane County, official gage was recorded the past week for Gulf 17 Waddell, new Ellenburger lime discovery in southern Crane County. Located in Section 15, Block 3, H.&T.C. Survey, the well rated a daily potential of 1,242 bbl., based on the last 4 hours of a 6-hour gage. Gas volume was 2,713,000 cu. ft. daily with a gas-oil ratio established at 2,104 to 1. While definitely classified as a new discovery, some geologists are of the opinion that continuous or at least spotted Ellenburger production will be developed between it and the Sand Hills Ordovician field proper. The discovery well was exceptionally high on all markers, its Ellenburger lime pay section being found from 5,635-48 ft., total depth.

### SOUTHERN WEST TEXAS COMPLETIONS

(24-hr. ratings based on last 3 hr. of 6-hr. gage)

**Crane County**

McElroy field: Gulf 238 McElroy, 765 bbl., open casing, 750-qt. shot, 2,679-2,979 bbl.
Gulf 241 McElroy, 1,016 bbl., open casing, 730-qt. shot, 2,648-2,948 ft.
Waddell field: Gulf 19 Waddell, 2,767 bbl., open tubing, 5,000 gal. acid, 4,350-4,473 ft.
Sand Hills field: Humble 4-C Tubb, 4-C Tubb, 1,375 bbl., open tubing, 3,000 gal. acid, 4,286-4,400 ft.

**Ector County**

Foster field: Cities Service 15 Rhodes, 2,068 bbl., open casing, 330-qt. shot, 4,055-4,160 qt.
Johnson field: Continental 7-B Johnson, 850 bbl., natural, 4,210-4,300 ft.
North Goldsmith field: M. A. Grisham 4 Cowden, 166

bbl., open tubing, 3,000 gal. acid, 4,226-4,501 ft.
Goldsmith field: Gulf 343 Goldsmith, 660 bbl., open tubing, natural, 4,164-4,227 ft.

**Pecos County**

Tobarg field: Cardinal Oil 62-E Tippett, 9 bbl. oil and 9 bbl. water, pumping, 482-483 ft.
White & Baker field: Shasta Oil 3 White & Baker, 144 bbl., open tubing, 100-qt., shot, 1,918-48 ft.
Landreth field: Landreth Prod. 2-J University, 160 bbl. oil plus 25 per cent water, 500 gal. acid, 1,731-47 ft.
Pecos field: Lee Petroleum 1 McKenzie, dry at 1,463 ft.
Wildcat discovery: Culbertson & Irwin 1 Heiner, Sec. 589, K.C.&S.F. Sur., 36 bbl. oil plus 2 per cent water, ¾-in. choke, 5,382-5,509 ft., P.B. from 5,665 ft., T.D., top Yates 900 ft., base Permian 5,116 ft., top Ellenburger lime 5,128 ft.

**Upton County**

McElroy field: Gulf 240 McElroy, 1,819 bbl., open casing, 670-qt. shot, 2,719-2,917 ft.

**Ward County**

O'Brien field: Gulf 162 O'Brien, 411 bbl., open casing, 440-qt. shot, 2,580-2,700 ft.

**Winkler County**

Kermit field: Ralph Loew 6 Campbell, 409 bbl., open casing, 500-qt. shot, 3,059-3,268 ft.
Keystone field: J. R. Sharp 4 Jenkins-Gulf, 381 bbl., ¾-in. choke, 240-qt. shot, 3,295-3,369 ft.

## SOUTHERN WEST TEXAS WILDCAT REPORT

**Crane County**

Gulf 1-F University, SE SE Sec. 22, Blk. 31, University Sur., top Simpson 9,600 ft., drilling 10,372 ft.
Gulf 17 Waddell, Sec. 13, Blk. 3, H.&T.C. Sur., 4 mi. S of Sand Hills field, drilled saturation 5,601-48 ft., tested 6,000,000 cu. ft. gas and show oil, top Detrital 5,538 ft., top Ellenburger 5,584 ft., flowed 334 B.O. in 14 hr., T.D. 5,548 ft., completed for 1,242 bbl. oil per day.
Eastham & Russell 1 McClintic, NE SE Sec. 210, Blk. F, C.C.S.D.&R.G.N.G. Sur., 7-in. 2,517 ft., 5½-in. 2,870 ft., show oil 2,882-87 ft., drilling 3,092 ft.

**Crockett County**

George T. Morris 1 Brock Hoover, SW SE Sec. 99, Blk. 1, I.&G.N. Sur., 2,000-ft. test, S.D. 1,037 ft.

**Ector County**

Cities Service 1 F. V. Addis, SW SE Sec. 34, Blk. 43, Twp. 2s, T.&P. Sur., drilled in new hole to 5,500 ft., P.B. 4,210 ft., bailing hole.
Forest Development Co. 1-C Edwards, SE SE SW Sec. 20, Blk. 43, Twp. 3s, T.&P. Sur., top anhydrite 1,760 ft., coring with slight porosity at 4,106 ft.
M. D. O'Quinn 1 T.X.L., SE NW W½ Sec. 31, Blk. 44, Twp. 3s, T.&P. Sur., first report.

**Loving County**

H. C. McAuley 1 E. Hall, SE Sec. 60, Blk. 7, W.N.&W. Sur., S.D. 4,820 ft.
Pinal Dome Oil 1 Michigan Oil fee, NW SW Sec. 15, Blk. 26-C, P.S.L. Sur., 5,300-ft. test, 10-in. at 1,172 ft., T.D., waiting on cement.

**Pecos County**

Stanolind 1 Conry-Davis, SW SW SW Sec. 31, Blk. 9, H.&G.N. Sur., Ordovician test in Abell area, top anhydrite 365 ft., Yates sand 1,120 ft., T.D. 3,002 ft., running 9⅝-in. casing.
O'Quinn 2 O'Neil, S½ Sec. 74, Blk. 10, H.&G.N. Sur., Ordovician test, T.D. 730 ft., reaming casing 679 ft.
Sinclair Prairie 1 Grove, Lot 9, Sec. 26, Blk. 9, H.&G.N. Sur., Ordovician test, fishing 1,360 ft.
Richards 1 Robbins, NW NW Sec. 68, Blk. 10, H.&G.N. Sur., drilling 810 ft.
Eastland Oil 1 Simmons, SW cor. Lot 12, Sec. 26, Blk. 9, H.&G.N. Sur., first report.

**Reagan County**

Amerada 1-RA University, 1,980 ft. from N and 660 ft. from E lines of Sec. 3, Blk. 48, University Sur., Ellenburger lime test, moving in material.
H. Schooler 1 R. A. Wolters, NE NE Sec. 51, G.C.&S.F. Sur., 8¼-in. 1,262 ft., drilling 2,025 ft.

**Reeves County**

C. A. Kitsos 1 A. B. Buchard, SW Sec. 7, Blk. 58, P.S.L. Sur., Delaware test, drilling 705 ft.
Roy Johnson 1 Perkins, Sec. 18, Blk. 7-C, P.S.L. Sur., S.D. 3,355 ft., prepare to run casing.
J. T. Pemberton 1 fee, NE NE Sec. 2, Blk. 55, Twp. 7, T.&P. Sur., Delaware lime test, 7,500 ft., preparing to start.

**Schleicher County**

Harold B. Opp 1 Jackson, Sec. 41, Blk. LL, T.C. Sur., T.D. 6,155 ft., fishing tools.

**Sutton County**

S. B. Roberts 1 George Allison, NW NE Sec. 44, Blk. K, G.H.&S.A. Sur., S.D. 740 ft., casing.
Domain 1 G. S. Allison, SW NE Sec. 91, Blk. 9, T.W. N.G. Sur., Ellenburger lime test, S.D. 1,098 ft.

**Terrell County**

Texas Consolidated Oil 1 Holmes, NE NE Sec. 14, Blk. 2-A G.H.&S.A. Sur., 3,600-ft. test, 10-in. 1,100 ft., T.D. 1,275 ft., preparing to start up.
H. H. Sides 1 Rose, Sec. 15, Blk. 148, T.&St.L. Sur., T.D. 680 ft., last report.
L. M. Thomasson 3 Bates-Graham, 660 ft. from N and 2,490 ft. from W lines, Sec. 30, Blk. 1, I.&G.N. Sur., S.D. 950 ft.

**Upton County**

H. C. Wheeler 1 Kincaid, 2,173 ft. from N, 467 ft. from E lines, Sec. 1, G.C.&S.F. Sur., drilling 125 ft.
Pittman & Atkins 1 Fowler-Starnes, NW NE Sec. 89, G.C.&S.F. Sur., 3,500-ft. test, S.D. 420 ft.

**Ward County**

Fitzpatrick & Slack 1 Wilson, Sec. 145, Blk. 34, H.& T.C. Sur., 1½ mi. SE of discovery well, T.D. 5,034 ft., testing show gas and oil.
Gulf 6 Wristen, 1,997 ft. from SE and 1,980 ft. from NE lines, Sec. 18, Blk. 7, H.&T.C. Sur., drilling 6,593 ft.
Roeser & Pendleton, Inc., and Merry Bros. & Perini 1 Bird Hayes, 467 ft. from SE and SW lines, Sec. 164, Blk. 34, H.&T.C. Sur., ¼ mi. N of discovery gas well, top saturation in Delaware sand 5,089 ft., T.D. 5,396 ft., P.B. 5,130 ft., shot 5,085-5,130 ft., no results, prepare to quit as failure.
J. E. Fitzpatrick 1 T. B. Pruit, SW SW Sec. 23, Blk. 1, W.&N.W. Sur., S.D. 140 ft.
Bells Wells 1 Wilson, NW SW Sec. 133, Blk. 34, H.& T.C. Sur., first report.

**Winkler County**

Stanolind and Westbrook & Thompson 1 Hendrick, NW NW NW Sec. 18, Blk. 26, P.S.L. Sur., first report.
Sam Weiner 1 Halley, NW NE Sec. 7, Blk. 11-B, P.S.L. Sur., first report.

## NORTHERN WEST TEXAS

Extending the West Andrews field of southwestern Andrews County another 1½ miles to the southeast, Phillips Petroleum Co. has completed 3 Embar, Section 9, Block 44, Township 1n, T.&P. Survey, for 117 bbl. of oil and 1½ bbl. of water daily, flowing, through 14/16-in. choke. The oil tested 36.4 gravity. The well had been treated with 1,000 gal. of acid in pay topped at 4,204 ft. and drilled to 4,279 ft.

*SLAUGHTER FIELD.*—Now the most active field in West Texas, the Slaughter field which embraces parts of three northern Permian basin counties, has a total of 74 active operations, either tests rigging up or actual drilling wells. During the past month of March there was a total of 36 new completions recorded, or an average of 9 per week. With March's total of 36 wells and February's total of 20 wells and January's total of 25 wells it is seen that 81 producers have been completed in the field during the first 3 months of this year. There is, to date, a total of 231 wells in the field. When it is considered that slightly more than one-third of the total wells in the field have been completed during the first 3 months of this year, it can easily be realized the rate at which activity is increasing in the field. The area was discovered in April of 1937, just exactly 4 years ago this week. There are many thousands of proven acres in the large field which will keep drilling at a rapid pace for several years to come.

*MITCHELL COUNTY.*—Drilling in brown lime, the C. E. Casebolt 1 J. E. Franklin, Mitchell County wild-

*(Continued on Page 106)*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POWELL VALVES

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# Hawkins Takes Lead as Most Active East Central Field

By R. MARNE SANFORD

DALLAS, Tex., Mar. 31.—Taking the lead as the most active field in East Central Texas and second only to the East Texas field in the entire district, the Hawkins field of Wood County recorded 7 new starts, 18 actual drilling wells, and 3 new completions during the past 7-day period. New oil wells were finaled by Bracken Oil Co., General American Oil Co., and Tex-Jersey Oil Co., all townsite wells. Each of the completions averaged about 450 bbl. daily which is representative of the best wells completed since the large discovery townsite producer. New starts in the field included five in the Hawkins townsite with one each by Cable Tool Drilling Co., General American Oil Co., Rogers Lacy, P. G. Lake, and B. B. Orr. Humble Oil & Refining Co. staked two more locations on its large block in the northern part of the field, the 1 Akins in the Parsely Survey, and the 1 Faulk in the Pollock Survey.

The thickest section of Woodbine sand yet reported for the Hawkins townsite was found during the week in the H. W. Stoddard 1 Hawkins Cemetery Association, which cemented casing on bottom at 4,783 ft. The test topped the Woodbine sand at 4,420 ft. and was credited with a 221-ft. section of broken saturation.

## SUMMARY OF COMPLETIONS

*East Texas Field*

(One-hour gages)

| | No. | Bbl. | Footage |
|---|---|---|---|
| Oil: Longview area | 6 | 375 | 21,642 |
| Kilgore area | 3 | 187 | 10,776 |
| Joiner area | 1 | 30 | 3,630 |
| Total | 10 | ..... | 36,048 |

*East Central Texas*

| | | | |
|---|---|---|---|
| Oil: Hawkins field | 3 | 1,240 | 14,371 |
| Chapel Hill field | 1 | 425 | 8,323 |
| Long Lake field | 1 | 181 | 5,379 |
| Talco field | 1 | 625 | 4,286 |
| Other fields | 2 | 79 | 6,290 |
| Gas: Chapel Hill field | 1 | *7.9 | 5,860 |
| Dry: Wildcats | 2 | ..... | 1,900 |
| Total | 11 | ..... | 46,409 |

*Million cu. ft.

## Wildcats Starting in Many Counties

*ANDERSON COUNTY.*—Huddleston & Prater have set 8-in. casing at 300 ft. and are drilling below 1,101 ft. at a new wildcat 5 miles northwest of Palestine in Anderson County. It is 1 W. A. E. Pfaff, located 1,700 ft. from the southwest and 1,800 ft. from the northwest lines of the R. Allen Survey. The location is about 2 miles west of the Texas Co. 1-A Greenwood, Salisar Survey, an active wildcat now drilling past 4,500 ft. after topping the Pecan Gap at 3,107 ft.

*FALLS COUNTY.*—Derrick is up for a new Falls County wildcat, Kelsey & Milley 1 L. A. Reed, A. De La Serda Survey, 3 miles northeast of Marlin. Location is 330 ft. from the west and southeast lines of a 67-acre tract in the survey.

*UPSHUR COUNTY.*—Expected to be one of the most closely watched wildcats in the East Central Texas district, L. S. White and O. S. Strickland have started moving materials to the site of a new location 1 mile southwest of the small town of Big Sandy in southwestern Upshur County. The test is 1 Gorman, in the northwest corner of a 144-acre tract in the S. G. Claytou Survey. Contract depth is set at 7,200 ft. unless production is found in the Woodbine sand.

*CHEROKEE COUNTY.*—A possible new wildcat for the Bullard area on the Cherokee and Smith County line was in prospect for the coming 90 days as a 4,500-acre block was nearing completion with most instruments filed carrying a 90-day drilling obligation. R. L. Pruett and C. M. Pope, Jr., both Tyler operators, have assembled the near-complete block 2 miles east of Bullard. Definite drilling plans have not yet been announced.

Another possible wildcat for Cherokee County was by John R. Bunn who has blocked 3,500 acres in the Turney area southeast of Jacksonville and agreed to start a test by April 15. The block is scattered through the W. F. Williams, J. M. Joiner, M. Garcia, M. Gutieres, and A. C. Walters surveys.

*NAVARRO COUNTY.*—W. L. Bartlett is making hole at 1 J. T. Mahaley, T. J. Chambers Survey, a projected shallow sand test 2 miles northeast of Rice and on a 162½-acre tract.

*RAINS COUNTY.*—In the northeast corner of Rains County L. L. Prock of Shreveport is reported to have staked tentative location for his planned wildcat test on a 5,000-acre block. The site picked is in the S. Yandel Survey and the proposed test is projected to the Woodbine sand.

### EAST TEXAS FIELD COMPLETIONS

(One-hour gages)

**Gregg County**

Longview area: General Crude Oil 15 Rembert, 20 bbl. in 30 min., 3,494-99 ft.
Magnolia 12 Saulter, 60 bbl., 3,614-27 ft.
Magnolia 30 White, 90 bbl., 3,518-34 ft.
Rowan & Nichols 6-B Todd, abandoned location.
Kilgore area: J. B. Halcomb 4-B Clayton, 20 bbl. in 15 min., 3,528-53 ft.
Shell 25 Bates, 30 bbl. in 26 min., 3,544-70 ft., P.B. from 3,612 ft., T.D.
Shell 28 Willoughby, 26 bbl. in 30 min., 3,535-90 ft., P.B. from 3,611 ft., T.D.

**Rusk County**

Joiner area: W. W. Hinchliffe 4 Pinkston, 30 bbl., 3,611-30 ft.

**Upshur County**

Longview area: Magnolia 39 J. W. Free, 35 bbl., 3,661-68 ft.
Margay Oil 15 Victory, 60 bbl., 3,593-94 ft.
Mudge Oil 21-A J. W. Free, 45 bbl. in 30 min., 3,672-3,720 ft.

### EASTERN TEXAS WILDCAT REPORT

**Anderson County**

Griffith Bros. 1 Clayton, William Frost Sur., Elkhart area, S.D. 50 ft.
R. H. & W. Oil 1 Saunders, 17-acre tract in Joseph Ferguson Sur., in Frankston townsite, top sub-Clarksville 4,874-4,910 ft., S.D. 5,225 ft.
Texas 1 Greenwood, M. Salisar Sur., 4 mi. NW Palestine, drilling 4,494 ft.
Huddleston & Prater 1 Pfaff, R. Allen Sur., 5 mi. NW Palestine, drilling 1,101 ft.

**Camp County**

Lucey 1 McKenzie, L. William Sur., ¾ mi. W of Pittsburg field, moving in rotary.

**Falls County**

Kelsey & Miller 1 Reed, A. De La Serda Sur., 3 mi. NE Marlin, derrick.

**Fannin County**

H. W. English 1 Parkhurst, M. P. Davis Sur., 7 mi. W of Leonard, derrick.

**Houston County**

G. C. Dixon 1 Texas Long Leaf Lbr. Co., J. Chears Sur., 5 mi. W of Lovelady, derrick.

**Lamar County**

Whitehead & Dahl Bros. 1 J. M. Barr, P. Compton Sur., 9 mi. S of Paris, derrick.

**McLennon County**

E. P. Campbell 1 Stewart, S. Burton Sur., 5 mi. N of Waco, S.D. 765 ft.

**Robertson County**

C. C. Baker & Son Middleton, J. S. McNeil Sur., 2 mi. S of Elliott, S.D. 20 ft.
H. A. Clary 1 A. G. Scott, H. F. Thornton Sur., 2 mi. W of Franklin, derrick.

**Navarro County**

Hargrave Oil 1 C. S. West, M. Boren Sur., 1½ mi. S of Richland, T.D. 3,257 ft., salt water.

**Rusk County**

Delta Drilling Co. 1 Kangerga, 113-acre tract in R. Lane Sur., 3 mi. N of Henderson, 8,200-ft. test, top Glen Rose 4,764 ft., first anhydrite 5,560 ft., second anhydrite 5,930 ft., top Massive anhydrite 6,200 ft., drilling 6,995 ft.
Beddinghouse 1 J. A. McCreary, H. Huejas Sur., 6 mi. SW of Enterprise, S.D. 204 ft.

**Upshur County**

Sun Oil 1 W. C. Henderson, NW cor. of 27-acre tract in 100-acre tract in Robertson Asher Sur., just outside town of Ore City, 7,000-ft. test, top first anhydrite 6,079 ft., second anhydrite 6,676 ft., base massive anhydrite 6,924 ft., coring 7,057 ft.
L. S. White and O. S. Strickland 1 Gorman, S. G. Clayton Sur., 1 mi. SW of Big Sandy, moving in material.

**Wood County**

Jackson & McGlothlin 1 Moore, 10-acre tract in Joseph Knight Sur.., in Crow townsite, Woodbine sand test, drilling 5,457 ft.

### EAST CENTRAL TEXAS COMPLETIONS

**Anderson County**

Long Lake field: Long Lake Prod. 9 I.&G.N. R.R. Co., 181 bbl., 5,372-79 ft.

**Falls County**

Wildcat: Jay Carruth 1 Westbrook, Manchaca Sur., 3½ mi. NE of Chilton, dry at 730 ft.

**Franklin County**

Talco field: B. G. Byers 3 Rutherford, 31 bbl. an hr., 4,245-86 ft.

**Freestone County**

Wortham field: Barney Carter 1 Summers, 64 bbl. net oil, 97 per cent water, 2,945-54 ft.

**McLennon County**

Wildcat: Frank Place 1 Hackney, I. Robbin Sur., 4 mi. SE of McGregor, dry at 1,170 ft.

**Navarro County**

Richland field: C. L. Brown 1 Davis, 15 bbl. oil, 80 per cent water, T.D. 3,336 ft.

**Smith County**

Chapel Hill field: Delta Drilling Co. 1 Shell-Walton, top Paluxy 5,776 ft., T.D. 5,860 ft., perf. casing 5,180-5,820 ft. with 161 shots, flowed 7,900,000 cu. ft. gas daily with 480 bbl. distillate, ½-in. choke.
Shell 1 Browning, total depth 8,323 ft., P.B. and perf. casing 8,351-54 ft., flowed 321 bbl. in 15 hr., ¼-in. choke.

**Wood County**

Hawkins field: Bracken Oil 1 McCleney, 382 bbl. in 18 hr., ¼-in. choke, perf. casing 4,750-4,801 ft. with 48 shots.
General American Oil 1-A Kay, 320 bbl. in 18 hr., ¼-in. choke, perf. casing 4,600-4,700 ft. with 96 shots.
Tex-Jersey Oil 1 McCleney, 340 bbl. in 18 hr., ¼-in. choke, perf. casing 4,850-70 ft. with 20 shots.

## Appalachian Fields

*(Continued from Page 90)*

**Cabell County**

Grant district: Monickle Gas 1 G. A. Alexander, 169,000 cu. ft gas, 16 hr. after shot, Big lime 1,542-1,708 ft., Injun 1,760-1,864 ft., Berea 2,308-20 ft., brown shale 3,240-3,538 ft. and 3,796-3,892 ft.; Corniferous lime 3,892 ft., shot in Berea 100 lb. gelatin in shale, 6,600 lb. Dentonite.

**Calhoun County**

Sherman district: McCall Drilling 1 Robert Smith, 300,000 cu. ft. gas, before shot; sand 1,360-1,410 ft., slate 1,410-1.730 ft., Salt sand 1,730-73 ft., gas 1,742-73 ft., T.D. 1,773 ft.

**Lincoln County**

Union district: Russell Gas 2 M. A. Stump, drilled deeper; started Berea 2,266 ft., brown shale 3,280-3,360 ft. and 3,380-3,580 ft., gas gaging 73,000 cu. ft. at 3,440-50 ft., shut 2,808-3,583 ft.

**Logan County**

Logan district: South Penn 61 Yawkey-Freeman, 492,000 cu. ft. gas, after shot, Berea, T.D. 3,240 ft.

**Pleasants County**

McKim district: Bonar & Coffman 2 S. T. Fleming, 200,000 cu. ft. gas, Injun sand, T.D. 2,067 ft.

**Putnam County**

Curry district: Parr Gas 1 Homer Mabe et al, 179,000 cu. ft. gas before shot, Salt sand 907-1,290 ft., Big lime 1,414 ft., gas 1,548 ft., T.D. 1,568 ft.
Randolph Gas 1 Eva Rupe, surface, drilled deeper, started 1,720 ft., Big lime 1,608 ft., T.D. 1,763 ft., gage 1,000,000 cu. ft. gas.

**Upshur County**

Buckhannan district: Pittsburgh & W. Va. Gas 7763 Charles Betts, 58,000 cu. ft. gas, Benson sand 4,562-77 ft., gas 4,566-69 ft., T.D. 4,750 ft.
Pittsburgh & W. Va. Gas 7764 U. G. Young, 75,000 cu. ft. gas, Benson sand 4,559-71 ft., gas 4,568-09 ft., T.D. 4,594 ft.
Ivy Gas 1 Cain Wilfong, old well drilled deeper, 84,000 cu. ft. gas, Gordon sand 2,225-40 ft., gas 2,235-40 ft., T.D. 2,327 ft.

**Wetzel County**

Proctor district: Manufacturers Light & Heat 1 John Parson, dry, through Gordon, T.D. 3,114 ft.

### ORISKANY GAS FIELDS

**Jackson County**

Ripley district: United Fuel Gas 4982 E. G. Scheer, 4,483,000 cu. ft. gas after 60-qt. shot, Corniferous lime 5,093-5,205 ft., Oriskany 5,205-51 ft., gas 5,208-17 ft., T.D. 5.251 ft.

### NEW WORK

**Kanawha County**

Poca district: Columbian Carbon 1 A. J. Wilkinson, elev. 675.4 ft.
Columbian Carbon 1 D. F. Fields, elev. 1,042.1 ft.

**Logan County**

Logan district: Boone County Coal 20 fee, elev. 1,672.14 ft.

By ROBERT INGRAM

# Shaeffer Pool Gains New Pay From Lansing-Kansas City

POTENTIAL production of Kansas crude oil as calculated by the state Corporation Commission reached a new peak last week. It had increased by 124,905 bbl. a day in the past month and was reported at an all-time high of 7,425,400 bbl. on March 20. This figure was based on the rated productive capacity of 6,305 prorated wells gaged at 7,372,311 bbl. daily and 14,615 nonprorated wells producing 53,099 bbl. a day.

While the commission's report was an indication of the manner in which the state's oil industry and productive capacity is growing, it does not actually show the number of barrels the state can produce. What the physical potential of the state would be if all wells were allowed to produce at capacity is a question of much debate in oil circles. However, the rated productive capacity by the conservation officials does serve as a guide to the rate of increase of reserves.

In line with the record productive capacity reported by the commission, Theo A. Morgan, state conservation director, suggested the April allowable be set at a new record high of 210,700 bbl. a day. At the commission's hearing at which he made his recommendation, Mr. Morgan testified that purchasers had indicated they would need 206,581 bbl. of oil a day from Kansas wells during the next month. He suggested that the allowable include 204,700 bbl. daily for current production and 6,000 bbl. a day for new wells completed during the month. The March allowable was 198,200 bbl., and the Bureau of Mines estimated market demand in April was set at 200,700 bbl. a day.

## SUMMARY OF COMPLETIONS

| | No. | Bbl. | Footage |
|---|---|---|---|
| Oil wells: Bemis-Shutts | 1 | 119 | 3,408 |
| Burnett | 3 | 9,000 | 10,069 |
| Hall-Gurney | 4 | 5,106 | 11,972 |
| Kraft | 2 | 234 | 6,596 |
| Silica | 2 | 3,265 | 6,508 |
| Stoltenberg | 1 | 207 | 3,275 |
| Zenith | 1 | 475 | 3,742 |
| Other fields | 7 | 15,227 | 22,971 |
| Wildcats | 1 | 185 | 3,653 |
| Dry holes: Bornholdt | 1 | ..... | 3,336 |
| Wildcats | 3 | ..... | 10,439 |
| Total | 26 | ..... | 85,969 |

## Shaeffer Pool Gains Shallow Production

Meantime operators continued to open new production in western Kansas. The new Shaeffer pool of northern Stafford County, opened by Atlantic Refining Co. in the Arbuckle earlier this year, paid off last week from the shallower Lansing-Kansas City lime series in L. J. Bodine 1 Willcutt, E½ NE SE 4-21-13w. The well was swabbing some oil after casing was perforated with 71 shots from 3,396-3,405 ft., and at week's end, after being treated with acid, flowed 600 bbl. of 31-gravity oil in 8 hours. The 1 Willcutt is a west offset to the Atlantic et al 1 Shaeffer, W½ NW SW 3-21-13w, which was completed at a total depth of 3,552 ft.

## AVERAGE DAILY PRODUCTION

### LEADING KANSAS FIELDS

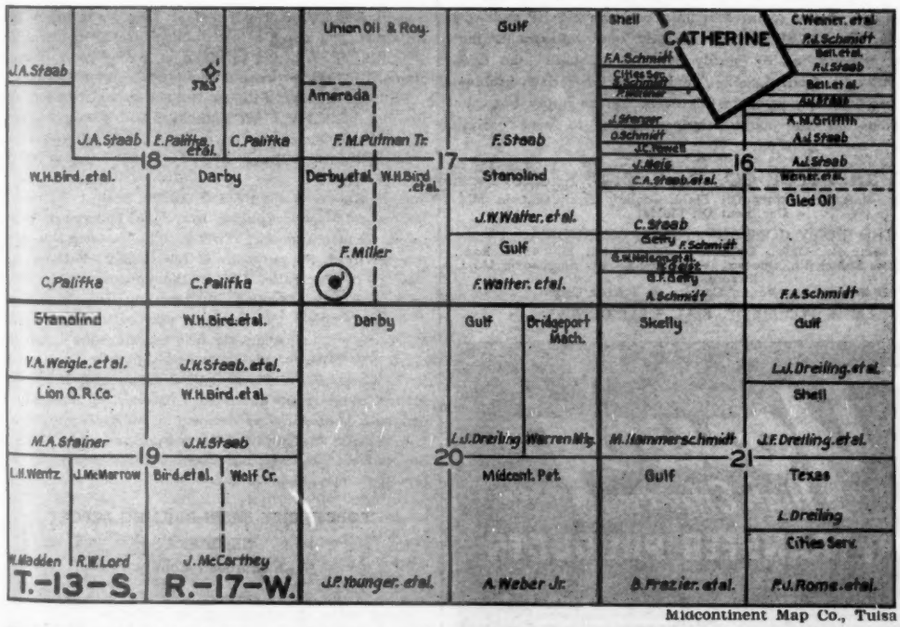
| | Mar. 29 | Mar. 22 |
|---|---|---|
| Augusta | 1,150 | 1,150 |
| Bemis-Shutts | 10,500 | 9,850 |
| Bloomer | 5,100 | 5,850 |
| Burnett | 6,850 | 6,450 |
| Burrton | 7,400 | 7,450 |
| Chase | 4,650 | 4,350 |
| Eibing | 1,000 | 1,050 |
| El Dorado-Towanda | 7,150 | 7,050 |
| Geneseo | 5,250 | 5,400 |
| Graber | 2,700 | 3,000 |
| Greenwood County | 8,500 | 8,600 |
| Hollow-Nikkel | 1,400 | 1,400 |
| Keesling | 900 | 1,500 |
| Lerado | 750 | 650 |
| Lorraine | 1,350 | 1,700 |
| Oxford | 700 | 650 |
| Rainbow Bend | 900 | 900 |
| Raymond | 1,150 | 1,100 |
| Ritz-Canton | 3,650 | 3,600 |
| Trapp | 14,800 | 17,450 |
| Balance Russell County | 20,200 | 21,000 |
| Sedgwick County | 3,100 | 3,150 |
| Voshell | 1,650 | 1,700 |
| Silica | 16,650 | 18,950 |
| Wellington | 1,050 | 1,100 |
| Wherry | 3,550 | 3,200 |
| Zenith | 7,200 | 7,250 |
| Others | 72,350 | 70,500 |
| Total | 211,650 | 216,000 |

*COWLEY COUNTY.*—A new Burbank sand pool was opened a mile northeast of the Frog Hollow pool of Cowley County by William M. McKnabb 1 Miller, SW SE NE 15-32-5e, which filled 400 ft. with oil from a total depth of 3,068 ft. Production in the Frog Hollow pool also comes from the Burbank sand and, as in the case of many western Kansas pools, may eventually tie in with that opened by the new well. Operators ran casing at week's end and planned to shoot the sand with nitroglycerin for a production test.

*KEARNY COUNTY.*—Far western Kansas also came into the spotlight last week when Stanolind 1 Bellinger, a rank wildcat in Kearney County 30 miles west of the Nunn pool had a show of oil from the Topeka lime topped at 3,660 ft. The well is located in E½ SE SW 15-21-38w. When the Topeka showed a stain, operators cored from 3,780-89 ft. and recovered 18 ft. with a show of oil in the dolomite from 3,780-98 ft. A drill-stem test was to be taken at once.

The same area caused some excitement last year when Stanolind 1 Judd, SE SE 15-21-38w, just ¾ mile to the east of the present test, logged oil stains in both the Topeka and Lansing-Kansas City lime formations. However, after casing was set on the 1 Judd, operators were unable to develop commercial production.

*BARTON COUNTY.*—A new intermediate producing horizon for the Ainsworth pool in Barton County also appeared in the offing at week's end as Stanolind 2 Zugg, E½ SE NW 35-16-13w, tested saturation in the Lansing-Kansas City. The well offsets production from the Arbuckle and was originally drilled to the Arbuckle at a total depth of 3,445 ft. It was plugged back, however, to 3,290 ft., and the casing perforated at 3,279 ft. for a test. If productive, the well will open the third pay for the field.




Midcontinent Map Co., Tulsa

*Completion of Derby Oil 1 Miller, circled above in S½ SW SW 17-13-17w, for 185 bbl. a day, gave Kansas another new oil pool this week. The pool has already been named Southwest Catherine, and announcement has been made that three offset wells are to be drilled at once by Derby and Lion Oil Refining Co. of El Dorado, Ark.*

### KANSAS COMPLETIONS

**Barton County**

Feltes pool: R. E. Day 2 Feltes, SE NE 14-16-12w, 3,000 bbl., Arbuckle, T.D. 3,342 ft., acid.
Kraft pool: Carter 7 Kraft, W½ NE NE 10-17-11w, 164 bbl., Arbuckle, T.D. 3,276 ft.
Shell 4 Burmeister, NE SE SE 3-17-11w, 70 bbl., Arbuckle, T.D. 3,320 ft.
Marchand pool: Continental 4 Scheufler, W½ W½ NW 24-20-12w, 809 bbl., Arbuckle, T.D. 3,374 ft.
Silica district: Magnolia 22 Roetzel, W½ NE NE 24-20-11w, 3,000 bbl., Arbuckle, T.D. 3,249 ft.
C. E. Ash 1-C Schartz, SE NE 12-20-12w, 265 bbl., Arbuckle, T.D. 3,259 ft.

**Ellis County**

Bemis pool: W. K. Royalty 4 Hadley, NW SW NW 20-11-17w, 119 bbl., swabbing, Arbuckle, T.D. 3,408 ft.
Burnett pool: Darby Petroleum 7-B Hadley, N½ SW NW 13-11-18w, 3,000 bbl., acid, Arbuckle, T.D. 3,346 ft.
Dickey Oil 6 Kollman, N½ SE SE 18-11-17w, 3,000 bbl., Arbuckle, T.D. 3,341 ft., acid.
Dickey Oil 5 Stein, NE SE 7-11-17w, 3,000 bbl., Arbuckle, T.D. 3,382 ft.
Wildcat (Southwest Catherine): Derby Oil 1 Miller, S½ SW SW 17-13-17w, 185 bbl., Arbuckle, T.D. 3,653 ft., acid.

**Ellsworth County**

Stoltenberg pool: Darby Petroleum 1 Peterman, S½ SE SE 11-17-10w, 207 bbl., Arbuckle, T.D. 3,275 ft.
Wildcat: Pryor & Lockhart et al 1 Weisenthal, SW SE NE 30-15-10w, dry, T.D. 3,325 ft., Arbuckle 3,312 ft., weathered Arbuckle 3,275 ft.

**Marion County**

Lost Springs pool: Ring Mac 1 Hajek, S½ NE SW 33-17-4w, 153 bbl., Mississippi chat, T.D. 2,426 ft.

**Pratt County**

Cairo pool: Skelly 1-A F. Lunt, NW 18-28-11w, 3,000 bbl., Viola lime, T.D. 3,338½ ft.

**Rice County**

Bornholdt pool: Earl Wakefield 1 George Smyres, E½ NE SE 35-19-6w, dry, T.D. 3,336 ft., Mississippi chat 3,259½ ft.
North Chase pool: McPherson Drilling 1-B Grizzell, SW NE 8-19-9w, 3,000 bbl., Arbuckle, T.D. 3,236 ft.
Raymond pool: Stormfeltz & Hyde 2 Specht, NE SW 16-20-10w, 3,000 bbl., Kansas City lime, 3,142 ft.

**Rooks County**

Wildcat: Russo Drilling 1 Dick, NW SW 21-10-19w, dry, T.D. 3,827 ft.

**Russell County**

Hall-Gurney pool: Alva Billings 4 Hall, S½ NE 21-14-14w, 83 bbl., swabbing, Lansing-Kansas City, T.D. 3,104 ft.

Skelly 8 Ben Rein, S½ NE SW 25-14-14w, 185 bbl., Lansing-Kansas City, T.D. 3,001 ft.
Darby Petroleum 2-A Strecker, S½ NE NE 25-14-14w, 2,619 bbl., Lansing-Kansas City, acid, T.D. 2,930 ft.
Skelly 3 Ehrlich, NW SW 32-14-13w, 2,218 bbl., Kansas City lime, T.D. 2,967 ft.

**Sedgwick County**

Wildcat: Deep Rock 1 fee, NW NE SW 20-27-2e, dry, T.D. 3,287 ft., Viola 3,274 ft.

**Stafford County**

McNaghten pool: Stanolind 3 Fitzgerald, N½ NE SE 22-24-13w, 2,265 bbl., Arbuckle, T.D. 4,113 ft.
Zenith pool: Transwestern 1 McNickle, NW SW NW 1-24-11w, 475 bbl., Viola, T.D. 3,742 ft.

## KANSAS DRILLING REPORT

**Barton County**

Derby Oil 1 Heinz ..... C W½ SW SW 10-18-11w
Drilling 2,197 ft.
Rex & Morris 2 Matthews .....NE SE NW 26-28-6
Drilling 2,020 ft.
Stearns & Vernon 1 Popp .....NE SE NW 15-16-14w
Drilling 1,725 ft.

**Brown County**

McAlpine et al 1 Tyler .....NE SW SW 4-3-15
S.D. 1,000 ft.
John Gernon et al 1 Bruce....C E½ SE SE 15-3-15
Drilling 350 ft.

**Cowley County**

Trees Oil 1 Rhodes .....NW SW SE 13-31-4
Drilling 2,520 ft.
Aladdin Pet. 1 Westerfield .....NE SW NW 3-32-8
Drilling 1,225 ft.

**Douglas County**

Meinholdt & Edwards 1 Stanley..NW NE NW 3-14-21
Show gas 1,255 ft., drilling 1,314 ft.

**Elk County**

McPherson et al 1-A Batesman....SE SW NW 24-28-11
Est. 1,000,000 cu. ft. gas 495-97 ft., drilling 520 ft.

**Ellis County**

Crow Drlg. 1 Miller .....C S½ SW SW 17-13-17w
Lansing 3,426 ft., show oil, Arbuckle 3,645 ft., T.D. 3,653 ft., swabbed 82 bbl. oil in 4 hr., gravity 30.5.

**Jefferson County**

Caufield & Sullivan 1 Ragan.....SW SW SE 19-10-20
Drilling 1,655 ft.
McCain & Sherrod 1 Green.....SW SW NW 9-11-19
Drilling 1,620 ft.

**Kearny County**

Stanolind 1 Billinger.....E½ SE SW 15-21-38w
Drilling 3,632 ft.

**McPherson County**

Continental 1 Conrad.....SE SW NE 31-19-5w
Drilling 890 ft.

Rocket Drlg. 1 Miller.....C W½ SW SE 12-17-1w
Drilling 168 ft.

**Nemaha County**

Bumpus et al 1 Achten.....S½ SE NW 12-4-14
Drilling 2,245 ft.

**Pratt County**

George Reeves 1 Stark .....W½ SW NW 18-26-11w
Drilling 2,288 ft.

**Reno County**

R. E. Hess & Son 1 McKee.....E½ NE SE 8-22-8w
Topeka 2,490 ft., Lansing 3,050 ft., underreaming 6-in. 3,137 ft.

**Russell County**

Central Pet. 1 Zeman .....SW SW NE 16-15-12w
6-in. 3,130 ft., Sooy 3,254 ft., T.D. 3,295 ft., 1 bbl. oil in Sooy.
Continental 1 Sibrara.....NE SW NE 34-13-13w
Topeka 2,680 ft., Lansing 2,986 ft., cored 3,020-3,049 ft., show oil, Sooy 3,294 ft., Arbuckle 3,323-31 ft.
Wakefield 1-A Cook .....C E½ SE NE 26-13-15w
Drilling 50 ft.

**Stafford County**

Stanolind 1 Nagel .....C E½ NE SW 3-24-15w
Simpson sand 4,070-74 ft., show gas, Arbuckle 4,100 ft., T.D. 4,155 ft., no shows, cement back to 3,838 ft.

**Thomas County**

Alva Billings 1 Ryan .....E½ NE SE 27-8-32w
Show oil 4,120 ft., 6-in. 4,132 ft., drilling 4,160 ft.

**Woodson County**

Phillips 1 Wix .....SE NE SE 31-25-15
Drilling 360 ft.

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## FOREST CITY BASIN

ST. JOSEPH, Mo., Apr. 1.—A general pickup in the Missouri, Nebraska, Iowa, and Kansas portions of the Forest City basin was observed the past week, particularly in Nebraska, where an active drilling campaign is not far distant. On the strength of Hunton lime showings in a well just west of Dawson it appeared that a new pool was about to be opened some 12 miles northwest of Falls City. This well was drilled by Guy Scott of Wichita and others. Hunton was topped at 2,548 ft., much lower than at Falls City, but saturation showed in the top 4 ft. and again in the next 13 ft., according to the operator. Pipe was cemented for a test.

Falls City's pool had at least one new producer, it was believed, but probably two more dry holes. Ohio Oil Co. 1 Gerhardt, in the north end of the pool, had good showings in the Hunton. Two other tests, 4 Bucholz and 2 Boice, drilled in the same part of the pool by the same company, looked like dry holes. For its next venture Ohio Oil Co. is going in with Harry Harper to drill jointly between the Sibbernsen and the Bucholz lease, CNL NW NE NW 20-1n-16e. This is to do away with 10-acre drilling.

Two miles west of Humboldt, Richardson County, Palensky et al found the Wilcox sand dry. Johnson and Mitchell started 2 Eickhoff 5 miles southeast of Shubert, C NW NW 4-2n-16e, but shut down after spudding.

In the Shubert pool Garetson & Knisely acidized with 500 gal. and then applied 200 gal. more under high pressure. The well found Hunton lime at 2,515 ft. and oil rose encouragingly in the pipe when plug was drilled. First reports said there was no water. This well is a north offset to Black Gold Operating Co. 1 Smith, which began to make so much water in early stages that operators set about plugging back.

Phillips Petroleum Co. moved rotary tools to Nemaha County to drill 1 J. W. Neil, in C SW NE 24-4n-14e, 2 miles southeast of the town of Howe. During the past year wildcatters have drilled 12 dry holes in the county.

Ohio Oil Co. announced a wildcat test, 1 J. A. Wisnom, for Fremont County, Iowa, and contractor began to move in equipment. This will be just southwest of the town of Farragut in C NW NE 23-68n-41w. Ike Taylor, of Centralia, Ill., is the contractor. Location was established through core drilling.

A new shallow gas test was started in Ray County, Missouri, and an Arbuckle test in the same county, 1 Rust, NW NW 21-53n-26w, was about to be started by R. L. Campbell of St. Joseph. Nathan and Brin were unable to start up again in 1 Decker, C NW NW 1-61n-38w, Holt County, because of motor trouble.

In Kansas McLaughlin Sons, Inc., had a dry hole in Leavenworth County but started another well in Jefferson County.

**FOREST CITY BASIN DRILLING REPORT**

**NEBRASKA**

**Richardson County**

Ohio 2 Boice.....SE NE 18-1n-16e
Hunton lime 2,314 ft., T.D. 2,320 ft., drilled plug and found little oil, abandonment probable.
Ohio 4 Bucholz.....C SW NW 17-1n-16e
Hunton 2,300 ft., T.D. 2,303 ft., showing poor, may be abandoned.

*(Continued on Page 112)*

# Texas' First Off-Shore Well Is Completed in Miocene Sand

By NEIL WILLIAMS

HOUSTON, Tex., Mar. 31.—British American Oil Producing Co. 2-71 State, completed earlier in the week as the discovery well of the first field offshore from the Texas coast in the Gulf of Mexico, flowed 119 bbl. of 26.7-gravity oil in 18 hours. The test was made through a 9/64-in. choke, and tubing pressure was 700 lb., and casing pressure 225 lb. A potential test was scheduled to be made at the close of the week. The well is located about 9,000 ft. offshore from Jefferson County, and was drilled to a total depth of 6,721 ft. Production was obtained by perforating casing in the Miocene sand at 4,980-90 ft. The sand section was logged by an electrical survey at 4,981-95 ft.

The discovery well was the second test drilled in the area by the company and was located south of 1-71 State which was abandoned in December of last year after mechanical trouble developed at 7,600 ft. due to heaving shale. This area has been looked upon as a favorable prospect for a number of years and the area has been worked extensively with geophysical instruments. The depth of the water at the discovery well is approximately 22 ft., and the well was drilled from piling foundations. The first test drilled was I. E. Harwell 1 State which was abandoned in heaving shale at a depth below 5,800 ft. Leases on several thousands of submerged acres extending along the shore line of the Gulf of Mexico were approved by the state several years ago, and this type of development is expected to play an important part in future Gulf Coast development. This is the second field to be opened in the gulf and is located about 65 miles west of the Creole field offshore from Cameron Parish, Louisiana.

● SUMMARY OF COMPLETIONS ●

| | No. | Bbl. | Footage |
|---|---|---|---|
| Oil wells: Lolita | 4 | 1,064 | 21,809 |
| West Ranch | 3 | 678 | 16,682 |
| Other fields | 9 | 2,495 | 42,791 |
| Gas wells: Wildcats | 1 | ..... | 6,025 |
| Dry holes: Wildcats | 4 | ..... | 29,494 |
| Fields | 3 | ..... | 23,674 |
| Total | 24 | ..... | 140,475 |

## Wildcat West of Hamman Draws Attention

Considerable interest was centered on Stanolind 1 L. F. Huebner, a wildcat located about 2 miles west of the Hamman field, Matagorda County. Total depth is 10,500 ft., and 5½-in. casing was cemented at 9,000 ft. following an electrical survey. Details of the survey were not revealed and it was not reported whether a test would be made or the hole drilled deeper. In the Blessing field, Texas 1 Williams, about 3,000 ft. northwest of production, was abandoned at a total depth of 8,651 ft.

In the same county and located in the Buttermilk Slough field, Rowan Drilling Co., Hebert & Smith staked location for 1 American National Realty Co., 660 ft. from the south line and 660 ft. from the east line of Section 26, Theo F. Kock subdivision in the John Duncan Survey. This field is located about 4 miles west of the town of Palacios, and was opened by the Sun Oil Co. in 1939. The present well is the first activity for the area since its discovery.

Phillips 1 Triangle Development Co., 1 mile east of the Chocolate Bayou field, Brazoria County, is in the final stages of completion after the well showed promise of opening the first oil production for the structure. The drill-stem tests in sand sections at 10,000 and 11,000 ft. recovered salt water, and the hole was plugged back and a test was made at 9,950-53 ft. On a 17-minute drill-stem test 4,770 ft. of 37-gravity oil and 2,000 ft. of salt water was recovered. At the close of the week the well was being tested in the same sand section following a cement squeeze job.

Strake 1 Griffith, a probable pool opener located in the Halls Bayou area, Brazoria County, was running tubing for a production test after perforating 5-in. liner at 10,371-89 ft. The test was made after two attempted drill-stem tests failed. Total depth of the hole is 10,410 ft., with 5½-in. liner cemented on bottom.

## La Ward Field Extended Southeast

Humble 1 Strauss, several hundred feet southeast of production in the La Ward field, Jackson County, flowed 384 bbl. per day through a ¼-in. choke. Tubing pressure was 350 lb., and casing pressure 1,200 lb. Total depth is 5,225 ft., and 5½-in. casing was cemented at 5,215 ft. Location for a projected 6,500-ft. north outpost was made by the company with the announcement for 3-B Mauritz, in Block 9, B. J. White Survey, about 1,600 ft. north of 2-B Mauritz, recently completed to extend production northeastward. The name of this field is being changed to "Maurbro," and the first pipe-line outlet for the field is being started by the Magnolia Pipe Line Co. which is laying a short line to tie into the company's main line extending from the West Ranch field to its pump station at Sealy in Waller County.

An extension to the deep sand opened on the northwest flank of the Fannett dome, Jefferson County, last year was indicated by Superior Oil Co. of California 1 Bordages, which is drilling ahead below 8,700 ft. after logging several interesting showings of oil and gas. An electrical survey showed a broken sand and shale section with 3 ohms resistivity and 50 mv. porosity from 8,045-8,105 ft., while 4 ohms and 80 mv. were recorded at 8,376-8,420 ft., and at 8,436-70 ft. Side-wall cores at intervals from 8,061-8,418 ft., recovered sand with an oil show.

Houston & Thompson staked location for a Wilcox test in the West Conroe area, Montgomery County, and material is being moved in. The well is 2 E. B. Clary estate, projected 8,500-ft. test located in the William S. Allen Survey, about 900 ft. southeast of the operator's 1 Clary, a gas well which was completed in 1938 from the Cockfield sand at 4,700 ft.

### TEXAS GULF COAST COMPLETIONS

**Brazoria County**

Old Ocean field: Harrison & Abercrombie 1 Bernard River Land & Development Co., 629 bbl., ¼-in. choke, top sand 10,120 ft., T.D. 10,268 ft.
Lockridge field: Shell 9-B Ramsey State Prison Farm, 338 bbl., ¼-in. choke, top sand 6,348 ft., T.D. 6,381 ft.
West Columbia field: S. W. Richardson 1 Holmes, 410 bbl., ¾-in. choke, perf. casing 5,785-5,827 ft., T.D. 6,160 ft.

**Hardin County**

Batson field: Ada Belle Oil Co. 293 Honeymoon, 8 bbl. oil and 225 bbl. water, pumping, top sand 844 ft., T.D. 880 ft.

**Harris County**

Tomball field: Humble 5-A Martenx, 456 bbl., ¼-in. choke, T.D. 5,601 ft.
Wildcat: O. J. McCullough 1 W. S. Swilley, dry, T.D. 4,510 ft.
Sun 1 Foster Lumber Co., dry, T.D. 8,503 ft.

**Jackson County**

Lolita field: Humble 2 H. C. Mitchell, 441 bbl., ¼-in. choke, top sand 5,260 ft., T.D. 5,282 ft.
Magnolia 6 Hinshay, 159 bbl., 11/64-in. choke, top sand 5,934 ft., T.D. 5,936 ft.
Magnolia 14 Mitchell, 259 bbl., 11/64-in. choke, T.D. 5,296 ft.
Skelly 4 Sussie Ward, 205 bbl., 5/32-in. choke, top sand 5,270 ft., T.D. 5,295 ft.
Navidad field: W. Stewart Boyle et al 1 Terrell, gas well, perf. casing 3,786-93 ft., T.D. 6,025 ft.
West Ranch field: Phillips 5 Toney, 557 bbl., ¼-in. choke, top sand 5,704 ft., T.D. 5,820 ft.
Magnolia 133-A West, 81 bbl., 9/64-in. choke, perf. casing 5,094-5,100 ft., T.D. 5,106 ft.
Magnolia 134-A West, 40 bbl., 7/64-in. choke, perf. casing 5,512-26 ft., T.D. 5,756 ft.

**Liberty County**

Hull field: Gulf 28 Morris Phillips, 105 bbl., pumping, top sand 3,064 ft., T.D. 3,082 ft.
Gulf 29 Morris Phillips, 243 bbl., ¼-in. choke, top sand 3,114 ft., T.D. 3,136 ft.
Wildcat: George Echols 2 E. W. Boyt, dry, T.D. 8,757 ft.

**Matagorda County**

Blessing field: Texas 1 Williams, dry, T.D. 8,900 ft.
North Markham field: Ohio 3 Cornelius, 185 bbl., ⅛-in. choke, perf. casing 7,704-06 ft., T.D. 8,064 ft.

**Washington County**

Wildcat: John A. Deering 1 H. C. Buck, temporarily abandoned, T.D. 7,724 ft.

(Continued on Page 112)

## Kentucky Fields

(Continued from Page 86)

hour shifts. The well is in Magoffin County.

A completion is expected soon by Grant Rice in 6 Charles Helton in the Burning Fork district of Magoffin County. Work was slightly delayed by a fishing job.

Farmer Howard and Earl Prather of Falcon, Ky., have recently purchased a drilling machine from C. J. Sipple & Co., and are moving it to Sarch Montgomery, in Morgan County, which is about 1 mile from present production in Menifee County.

Eastern Kentucky operators are also keeping an interested eye on the Inland Gas Corp. 222 C. F. Conley, in Johnson County, near Paintsville. This well is about ½ mile from the Alborn Horn well, completed recently by Inland, for 400,000 cu. ft. of gas. Inland is down 222 ft. in sand in No. 222.

The Kentucky-West Virginia Gas Co. has completed 605 M. D. Slone, Cow Creek, in Floyd County, at total depth of 2,811 ft. in shale with a gas flow of 377,000 cu. ft.

### EASTERN KENTUCKY DRILLING REPORT

**Knott County**

Inland Gas Corp. 219 Sylvania Cornette, Big Branch of Troublesome Creek, 1,769 ft., Salt sand.
Inland Gas Corp. 220 Hindman, Settlemen School tract, Smith Branch of Carr Creek, building rig.
Inland Gas Corp. 221 Virginia Coal Co., Balls Fork, 3,543 ft., slate and shells.
Kentucky-West Virginia Gas Co. 528 Joseph Hall, fishing.
Kentucky-West Virginia Gas Co. 607 Isom Gibson, Jones Fork, 2,408 ft., shale.
Kentucky-West Virginia Gas Co. 5287 Ben Smith, 1,885 ft., Big lime.
Kentucky-West Virginia Gas Co. 5291 B. G. Dyer, Mill Creek, 1,640 ft., slate.
Kentucky-West Virginia Gas Co. 5297 Jesse Bates, rigging up.
Kentucky-West Virginia Gas Co. 5298 Joe King, Bates Branch, setting machine.
Kentucky-West Virginia Gas Co. 5299 Richard Hall, Dick Hall Branch of Right Beaver, 225 ft., slate.

**Pike County**

Kentucky-West Virginia Gas Co. 612 F. J. May, Island Creek, 555 ft., slate, shells.
Kentucky-West Virginia Gas Co. 5289 Green Thacker, Lower Pompey Branch of Levisa Fork, 790 ft., sand.
Kentucky-West Virginia Gas Co. 5294 Tandy Howell, 1,735 ft. in sand.
Kentucky-West Virginia Gas Co. 5293 Thomas Ford, Ford Branch, 1,450 ft., sand.

**Martin County**

Kentucky-West Virginia Gas Co. 5296 J. G. Carlisle, Cold Water Fork, 860 ft., broken sand.

**Floyd County**

Kentucky-West Virginia Gas Co. 601 Crit Mitchell, Mud Creek, 1,556 ft., cleaning out.
Kentucky-West Virginia Gas Co. 610 Elijah Akers, 1,090 ft., sand.
Kentucky-West Virginia Gas Co. 611 M. A. Davidson, 935 ft., sand.
Kentucky-West Virginia Gas Co. 5286 Anderson C. Stratton, Mare Creek, 2,370 ft., shale.
Kentucky-West Virginia Gas Co. 5290 Martha Alley, Frazier Creek, 1,500 ft., sand.
Kentucky-West Virginia Gas Co. 5295 James Harold, Head Cow Creek, 966 ft., limy sand.
Kentucky-West Virginia Gas Co. 5300 Solomon Akers, Branham Creek, building rig.

**Lee County**

Floyd Fitch 1 Sam Crabtree, Mount Olives, 300 ft.

### WESTERN KENTUCKY

**Butler County**

Silver City district: Billy Phillips 2 H. J. Gardner, dry, T.D. 515 ft.

**Daviess County**

Utica district: United Petroleum 1 R. Y. Cravens, dry, through Barlow sand, T.D. 1,431 ft.
Cane Run School district: Cane Run Petroleum et al 13 Zula Johnson, drilling at 200 ft.
Birk City district: Sargent et al 1 Flora G. Wahl, spud.

**Grayson County**

Leitchfield district: Sun 2 George Woods, moving in.

**Hancock County**

Saunders School district: Hupp et al 1 Osia Boling, drilling 200 ft.

**Henderson County**

Niagara district: A. V. Smith et al 1 E. Knight, 10 bbl., 60-qt. shot, stray sand, 685-700 ft.

**McLean County**

Calhoun district: Wanna Oil 1 Ohio Valley Oil Co. tr., drilling 150 ft.

**Muhlenberg County**

Four miles west of Graham: Carter 1 J. F. Roberson, completed stratigraphic test, approximate depth 3,300 ft.

**Ohio County**

Pleasant Grove Church district: Hoeffler & Carpenter 8 W. H. Davidson, drilling 300 ft.
H. O. Ogle 8 W. L. Tuttle, drilling 250 ft.
Westerfield district: Kruse & Nelson 15 Dave King, location.

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# Among the Drilling

PARKER Drilling Co., Houston, Tex., opened the first oil field offshore from the Texas coast, in the Gulf of Mexico, with the completion of British American Oil Producing Co. 2-71 State, located about 9,000 ft. offshort from Jefferson County. Using a diesel-electric rig mounted on piling foundation, in approximately 22 ft. of water, the well was drilled to a total depth of 6,721 ft. and production was obtained by perforating casing at 4,980-90 ft. On the Louisiana Gulf Coast, drilling was scheduled to get under way on Barnsdall 1 State, a wildcat located in the Point au Fer area, Terrebonne Parish.

IKE TAYLOR, Centralia, Ill., has been awarded contract to drill Ohio Oil Co.'s wildcat near the town of Farragut, Fremont County, Iowa.

SIEMONEIT Drilling Co., headed by C. J. Siemoneit of Fort Worth, Tex., who with Ed Taubert and Jesse McKee, also of Fort Worth, discovered the Abell field in northern Pecos County, Texas, has started drilling 1 Walsh, ¾ mile northeast of discovery producer. The Siemoneit company obtained a 22-acre farmout from Anderson-Prichard Oil Corp.

BREWER Drilling Co. has completed 1 Hoffman in the Dayton field, Eddy County, New Mexico, for daily production of 85 bbl. The contracting firm is moving in cable tools for 2 Williams in SE NW 23-18s-26e.

J. W. FRAZIER, Houston, Tex., is preparing to start drilling operation on an outpost well located about 2,000 ft. northwest of the Dyersdale field, Harris County, Texas. The well is 1 Dwyer, a projected 4,100-ft. test located in the W. Britton Survey. In the Cedar Bayou area, Chambers County, Dick Schwab 1 R. D. Fisher, a wildcat, was scheduled to be spudded the first of the week.

TRINITY Drilling Co., Fort Worth, Tex., has made location in the Jal field, Lea County, New Mexico, for a test in the C SW NE 10-24s-37e.

DELTA Drilling Co., Tyler, Tex., has completed the largest potential producing well yet registered in the Slaughter-Duggan field in southwestern Hockley County, Texas. The firm's 2-A Slaughter, in the northern part of the field, gaged 3,030 bbl. of net oil from total depth of 4,971 ft. and after treatment with 10,000 gal. of acid. The company completed two other producers last week. Delta 3-A Slaughter gaged 598 bbl. and its 2-B Slaughter made 640 bbl.

HENDERSON COQUAT, San Antonio, Tex., is scheduled to drill a 9,000-ft. Wilcox test on the south edge of the Oakville field, Live Oak County, Texas. Contract was received from Arkansas Fuel Oil Co. for 1 E. H. Brieger, a wildcat test 1½ miles west of Orange Grove, Jim Wells County.

RICHMOND Drilling Co., Midland, Tex., is moving rotary rig to drill Mascho Oil Co. 1 M. M. Fisher, a projected 4,750-ft. wildcat 1½ miles west of the old H. C. Wheeler 1 Fisher in the northwestern part of Andrews County, West Texas.

C. & I. Drilling Co., Houston, Tex., is drilling in shale and lime below 6,000 ft. in the company's joint wildcat located on the Evangeline Land & Mineral Co. lease on the old Pine Prairie salt prospect, Evangeline Parish, Louisiana.

STICE Drilling Co., San Antonio, Tex., has the contract for a 6,000-ft. test for the account of Hiawatha Oil & Gas Co., which is making an effort to extend the North Sweden field in Duval County, Texas.

O. W. DYER, Houston, Tex., has cemented surface casing on a wildcat which is being drilled for the Gulfboard Oil Co. in San Antonio Bay, Calhoun County, Texas. Another operation is reported in the St. Charles area, Aransas County, for Continental Oil Co.

HOUSH & THOMPSON, Houston, Tex., is moving a rotary to the West Conroe area, Montgomery County, Texas, for 2 E. B. Clary estate, a projected 8,500-ft. Wilcox test located in the William S. Allen Survey. The location is about 900 ft. southeast of the contractor's 1 Clary, which was completed as a gas well in 1938 from the Cockfield sand at 4,700 ft.

COMANCHE Drilling Co. has the contract to drill Phillips Petroleum Co.'s wildcat test in Nemaha County, Nebraska.

GEORGE ECHOLS, Houston, Tex., was expected to extend production in the newly opened St. Gabriel prospect, Iberville Parish, Louisiana, as 7-in. casing was cemented on bottom at 7,830 ft. in the contractor's 2-A Natalbany. Top of the sand section was logged at 7,782 ft. At the present time three rigs are being used by the contractor in developing his holdings, while a fourth rig is being moved from the Westwego area for 1 Louisiana Prison Farm, location for which was announced the past week. In the Double Gum area, Liberty County, Texas, 2 Boyt was abandoned after a drill-stem test recovered salt water.

WYNN CROSBY Drilling Co. is preparing to drill a deep test in the Vienna field, LaVaca County, Texas, possibly as deep as 15,000 ft.

ROWAN & HOPE, San Antonio, Tex., are moving a rotary 1 mile south of the Ben Bolt field, Jim Wells County, Texas, for 1 Kynitl, a Frio-Vicksburg test located in La Trinidad grant.

MILLER & SHIARELLA, Owensboro, Ky., have taken contract to drill a deep test for Sun Oil Co., 8 miles east of Litchfield, Grayson County, Kentucky. The test is 2 George Wood, 990 ft. south of the first Wood test which was abandoned.

ARROW Drilling Co. and Cherry-Barron-Kidd have installed a pump on their Aux Vases sand well, the 1 Pocket Realty Co., NW NE NW 2-4s-14w, Posey County, Indiana, and have moved one location east and prepared to drill another test. The completion made 215 bbl. of fluid per day after a 100-qt. shot at 2,846-63 ft. About 100 bbl. of fluid was water.

FRENCH Drilling Co. of Wichita Falls, Tex., has been awarded contract for drilling a deep test southeast of Verden in Grady County, Oklahoma. The test will be drilled for Stauffer Petroleum Co. and will be the 1 Tobe Smith in NW NW NE 28-7n-8w. About 6,000 acres of the large block has been assigned the contractor.

FRANK HINKLE, St. Elmo, Ill., has staked location for his 1 Jenks, 955 ft. from north line and 230 ft. from west line, NE 22-6n-5e, Mason pool of Effingham County, Illinois.

TURNER Drilling Co. was drilling below 700 ft. on its 1 Williams, N½ SW SW NW 6-6n-2e, Fayette County, Illinois, at last reports.

BIG CHIEF Drilling Co., Oklahoma City, Okla., and North American Oil Co. last week started their 1 Belle

# Contractors

Hirzel as an outpost to the new Guthrie pool in Logan County, Oklahoma. The test is in NE NW SE 18-17n-1w, nearly a mile south of the discovery well, and is located on a farmout from Sun Oil Co.

L. & W. Drilling Co. quit its 1 Plumlee, W½ SW NW 21-6s-1e, Franklin County, Illinois, at a total depth of 2,925 ft. The test topped the Ste. Genevieve lime at 2,719 ft.; none of the formations showed commercial production.

UNION Drilling & Producing Co., Mount Pleasant, Mich., has been awarded contract for drilling Sun Oil Co. 2-A State-Edenville in Midland County, Michigan. Location is in C N½ NW SE 4-16n-1w. At Sun 2 Goodwin in the Beaverton area of Gladwin County, Michigan, the contractor was drilling below 1,600 ft. at the week end. In the Winterfield area of Clare County, Michigan, Union is drilling below 3,475 ft. at the Sun 2-A State-Winterfield.

PARKER Drilling Co., Tulsa, was preparing to run a squeeze job on its 1 Trobaugh, NE SE SW 27-5s-6e, Hoodville pool, Hamilton County, Illinois. The hole is bottomed in the Benoist sand at a total depth of 2,971 ft.

H. H. WEGENER was testing on one well and had casing set on another test in the new Benton field in Franklin County, Illinois. The 1 C. W. & F., SW SE SW 24-6s-2e, swabbed and flowed 375 bbl. daily after a 25-qt. shot at 2,100-17 ft. in the Tar Springs sand. The 2 C. W. & F., NW SE SW 24-6s-2e, was cased after drilling to a total depth of 2,100 ft.

TWIN Drilling Co. of Grand Haven, last week was awarded contract for drilling Bundy Hill Natural Gas Co. 1 Winters in the Broomfield area of Isabella County, Michigan. Location of the 1 Winters is NE NE SE 10-14n-6w. At the Michigan Cities Natural Gas Co. 1 Diehl in the same field, Twin has moved in material preparatory to spudding.

WHISENANT & TRENCHARD are drilling on their south outpost to the Hoodville pool, the 1 Moore, SE SE NW 10-6s-6e, Hamilton County, Illinois.

OILWELL Drilling Co. was testing on its 2 Hillborn, SE SE NW 24-4n-9e, North Noble pool of Richland County, Illinois. The test had the Cypress sand at 2,570 ft. and was shot with 20 qt. at 2,575-85 ft.

W. D. WOOD, contractor of Albany, Tex., has the development contract in a recently opened shallow field in West Central Texas and is preparing to start a third test for the developing operators. The field was opened by Jack Bell 1 Howsley, SW cor. of Comanche Indian Reserve Survey 7, southern Throckmorton County, which made 10 bbl. daily from sand drilled from 635-49 ft. The field is now being developed by the Combined Oil Co., Fort Worth, Tex., which farmed out a small tract to the discovery operator. With W. D. Wood as contractor, a steady drilling program is planned for the company's acreage in the area. The field as yet has no outlet.

BUTLER & HORNE Drilling Co., Dallas, Tex., is preparing to skid rig and start a new test for Humble Oil & Refining Co. in the newly opened Swastika sand producing area of southwestern Jones County, West Central Texas. Humble opened the new area with its 2 Sears, which came in late last year. The past week 1-B Huddleston, a west offset to the discovery well, was brought in for 75 to 100 bbl. hourly from 3,003-5 ft. Rig will be skidded for a south offset to the discovery well to start at once. The completion the past week was 467 ft. out of the SE cor. of Section 38, Block 18, T.&P. Survey. The area is about 1½ miles south of new production developed from the Swastika zone 2 years ago by Humble and is 3 miles northeast of the old Noodle Creek field opened in 1926.

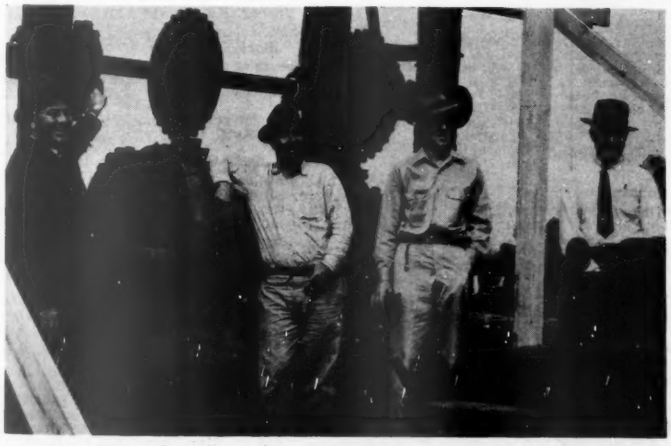
RICHMOND Drilling Co., Midland, Tex., has the contract and is moving in materials for a new Lea County, New Mexico, wildcat test for James W. Brown, Inc., 8 miles northeast of the Vacuum field. The test is 1 State, center Lot 11, 4-16-35. Contract depth is 5,300 ft.

HAYES Drilling Co. of Salem, Ill., has rigged up rotary for drilling its No. 2 New York Central Railroad in the old Allendale pool of Wabash County, Illinois.

W. B. JOHNSON Drilling Co. has staked location for its 1 Stutts in the Tinsley field of Yazoo County, Mississippi. Location is in the NW cor. of 31-10n-2w.

DELTA Drilling Co. is nearing completion of two wells in the East Calvin field of White County, Illinois. They are the 7 and 8 Boultinghouse in 16-4s-14w, bottomed in the Cypress at 2,600 ft.

BURR LAMBERT is testing his 8 Calvin in the East Calvin pool of White County, Illinois, following a 60-qt. shot at 2,830-58 ft. Located in NE NE SW 9-4s-14w, the well topped the Glen Dean at 2,314 ft., Cypress saturation at 2,620-59 ft. and Aux Vases at 2,829-35 ft.



*A. T. "Cap" McDannald, Gulf Coast drilling contractor and operator, operates seven rigs, including contract work and development of McDannald Oil Co. properties. This is not one of them, but a part of his collection of oil-field relics which is a division of this famous museum. The three-post draw works saw a lot of service in bygone days, and the rotary is of 1888 vintage. Resting on one of the rotary foundation timbers is an old "yellow-dog" rig lighter, which has passed its fiftieth anniversary. The "crew" is: "Cap" McDannald, I. N. Mills, R. H. Stark, Jr., and E. F. Hall. The location: Mr. McDannald's back yard at his Houston, Tex., headquarters*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# Devonian Lime Saturation Is Recovered in McKinley Test

MATTOON, Ill., Mar. 31.—For the first time in many weeks the west side of the Illinois basin occupied the spotlight of the Illinois oil industry late last week when Devonian lime saturation was recovered in the McKinley field of Washington County. The saturation was recovered at Joe L. Murphy 2 fee, NW NW NE 29-3s-4w, about 5 miles southwest of Oakdale, a test which was dry in shallower horizons.

The 2 fee, at an elevation of 537 ft., topped the Glen Dean at 672 ft. and the Benoist at 985 ft. The top of the Devonian was 2,250 ft. and the lime softened immediately. Approximately 7 ft. of the formation were cored but only 2 ft. were recovered. The core which was recovered carried a heavy saturation. Murphy's test is about a mile north of a dry Devonian test drilled by Phillips Petroleum Co. some time ago. With elevations of the respective sites taken into consideration, Murphy's venture ran 152 ft. higher on the Devonian top than did the Phillips test.

Murphy's test is unusually important because it may give the recently discovered McKinley field a new pay and it may be the first time in the history of the Illinois oil industry that the Devonian formation has paid off in an area where shallow horizons were dry. Murphy's test is also important in that a successful Devonian completion in the McKinley field most likely would spur exploration of the horizon in Washington County's Cordes field, 7 miles northeast of the McKinley area, where production is obtained from the Benoist sand.

*WHITE COUNTY.*—The new pool opened by Benedum-Trees last week in White County may go down as one of the most important Illinois discoveries of 1941. New importance was given to the area late last week when Hiawatha Oil 1 Bail, NW NW SE 19-7s-11e, second completion in the field, flowed 281 bbl. of oil in 16 hours through casing. The 1 Bail is bottomed at 2,121 ft. in the Tar Springs and is an offset of the discovery well which was completed on pump. Tubing was being run at 1 Bail at the end of the week and it will be completed as a flowing well. Also near completion in the new field at the end of the week was Benedum-Trees 2 Stinson, SE SW NE 19-7s-11e, where operators were drilling plug. The 2 Stinson cored excellent saturation in the Tar Springs horizon.

## Hope Fades for Fairfield Boom

Hopes for a townsite drilling boom in Fairfield blew up early last week with the abandonment of two offset wells to the originally flowing Watkins 1 Rossler, N½ SE SE 24-2n-7e. The 1 Rossler moved drilling to within a mile west of Fairfield and stirred wild hopes in the townspeople for a townsite-drilling campaign. However, these hopes faded as Weinert 1 Bunting and Watkins 2 Rossler failed to find the productive McClosky found in the first test and was abandoned. The 1 Bunting was bottomed at 3,300 ft. and the 2 Rossler at 3,320 ft.

*DAHLGREN POOL.*—The new Dahlgren pool of Hamilton County is gradually becoming more active and may soon rank as one of the important small pools of the state. Hall-Jordan 2 Deerhake, SE NW NE 34-3s-5e, was completed last week and flowed an estimated 1,134 bbl. after an acid treatment of 3,000 gal. in the McClosky at 3,305-21 ft. One other well, Witt & Krome 1 Gage, 34-3s-5e, was completed and is pumping approximately 20 bbl. of oil and 50 bbl. of water from the McClosky after an acid treatment while prospects of a good well are reported at Sinclair-Wyoming 2 Gage, 34-3s-5e, where casing is being set on the McClosky which was topped at 3,320 ft.

With two excellent producers in the field, 1 and 2 Deerhake, Hall-Jordan are now drilling 3 and 4 Deerhake, both direct offsets to 2 Deerhake. Meanwhile, Sinclair-Wyoming has staked four locations on the John Brumley lease, SE NW 34-3s-5e, and two locations on the Minnie Hall lease, SW SW 27-3s-5e.

## SUMMARY OF COMPLETIONS

| | No. | Bbl. | Footage |
|---|---|---|---|
| Oil wells: Benton | 4 | 1,196 | 8,639 |
| Dahlgren | 1 | 1,134 | 3,399 |
| East Calvin | 8 | 1,013 | 22,555 |
| East Patoka | 4 | 277 | 5,790 |
| Hoodville | 2 | 667 | 6,114 |
| Louden | 3 | 279 | 4,592 |
| Maud | 2 | 225 | 4,595 |
| Mount Carmel | 5 | 354 | 9,819 |
| Omaha | 3 | 361 | 5,163 |
| West Liberty | 4 | 1,963 | 11,285 |
| Other pools | 9 | 817 | 22,333 |
| Wildcats | 2 | 145 | 5,188 |
| Dry holes: Fields* | 8 | ..... | 15,623 |
| Total | 62 | ..... | 144,899 |
| Recompletions | 12 | 1,265 | ..... |

*Louden 1, Hoodville 1, Dundas 1, Allendale 1, Boyleston 2, East Calvin 1.

## ILLINOIS COMPLETIONS

### Bond County

Wildcat: Thomas Scharf et al 1 Calufotti, SE SW NE 27-7n-4w, dry, T.D. 620 ft.

### De Kalb County

Wildcat: J. E. Milburn 1 Eraas, NW NW SE 22-38n-3e, dry, Eau Claire 660 ft., Mount Simon 1,700 ft., old well deepened from 520 to 1,790 ft.

### Edwards County

Albion pool: Superior 6 G. Works, SW NW SW 18-2s-11e, pumped 145 bbl., 2,000 gal. acid, per 3,073-85 ft., 2,914-35 ft., old well P.B. from 3,173 to 3,115 ft.

### Fayette County

Louden pool: Carter 8 M. Tiroy, NE NE SW 32-8n-3e, pumped 108 bbl., 15-qt. shot 1,452-57 ft., perf. 1,424-1,567 ft., ripped casing 1,456-63 ft., old well worked over, T.D. 1,567 ft.

Carter 9 M. Tiroy, SE SE NW 32-8n-3e, flowed 50 bbl., pumped 84 bbl., 10-qt. shot 1,461-65 ft., perf. 1,456-70 ft., old well worked over, T.D. 1,577 ft.

Carter 3 Hickert, NW NW SE 8-7n-3e, pumped 115 bbl., Weiler 1,496-1,510 ft., Benoist 1,571-79 ft., old well deepened from 1,567 ft. to 1,582 ft.

Carter 1 A. Miller, NW SW SE 8-7n-3e, pumped 39 bbl., good sand 1,581-88 ft., 4-in. liner 1,477-88 ft., Weiler 1,480-1,523 ft., Benoist 1,573-88 ft., old well deepened from 1,574 ft. to 1,588 ft.

Carter 2 J. Richards, NE SE SW 1-8n-3e, pumped 84 bbl., 20-qt. shot 1,505-13 ft., Cypress sand 1,497-1,511 ft., T.D. 1,513 ft.

Carter 14 T. Wright, NE NW SE 20-8n-3e, swabbed 120 bbl., 20-qt. shot 1,448-56 ft., Weiler 1,443-68 ft., T.D. 1,538 ft., P.B. 1,452 ft., drilled out to 1,456 ft.

Vanderbark 4 Griffith, NW NW SE 17-7n-3e, pumped 75 bbl., 10-qt. shot 1,513-19 ft., 30-qt. shot 1,523-35 ft., Cypress sand 1,492 ft., T.D. 1,541 ft.

Blalock & Walters 2 Harding, SE SE NW 18-7n-3e, dry, Glen Dean 1,324 ft., Cypress sand 1,475 ft., Benoist 1,592 ft., 40-qt. shot on bottom, filled 100 ft. water an hr., junked hole, T.D. 1,601 ft., P.B. 1,575 ft.

Wildcat: John Pummill 1 Isbell, NW NE SW 33-8n-1w, dry, slight show gas 650-65 ft., slight show oil 990-98 ft., T.D. 1,507 ft.

### Franklin County

Benton pool: E. S. Adkins 3 Orient, SW SW SE 24-6s-2e, pumped 310 bbl., 15-qt. shot 2,134-49 ft., Tar Springs sand 2,121 ft., T.D. 2,150½ ft.

Manley Oil 1 Shumate, NW SE SE 24-6s-2e, pumped 325 bbl., 15-qt. shot 2,132-47 ft., Tar Springs sand 2,120 ft., T.D. 2,147 ft.

E. S. Adkins 1 McKemie, NW NE NE 25-6s-2e, pumped 350 bbl., 15-qt. shot 2,164-79 ft., Tar Springs sand 2,153 ft., T.D. 2,179 ft.

Shell 1 W. E. Dody et al, NE NW NE 25-6s-2c, pumped 211 bbl. oil and 5 bbl. water, 15-qt. shot 2,150-62 ft., Tar Springs 2,127-62 ft., T.D. 2,162 ft.

Wildcat: Langenfeld & Williams 1 Plumlee, W½ SW NW 21-6s-1e, dry, Rosiclare 2,783 ft., McClosky 2,833 ft., T.D. 2,930 ft.

### Gallatin County

Omaha pool: Carter 3 A. Kinder, NE NW NE 4-8s-8e, pumped 13 bbl., 5-qt. shot 1,720-22 ft., 10-qt. shot 1,714-19 ft., 10-qt. shot 1,719-24 ft., Palestine 1,712 ft., T.D. 1,724 ft., P.B. 1,714 ft.

Carter 2 Stella Rister, SE SE NW 4-8s-8e, flowed 330 bbl., 30-qt. shot 1,695-1,707 ft., Palestine 1,685 ft., T.D. 1,719 ft.

Seaboard 1 Colnon, NW NW SE 4-8s-8e, pumped 18 bbl., 15-qt. shot 1,713-17 ft., Palestine 1,707 ft., T.D. 1,720½ ft.

### Hamilton County

Dahlgren pool: Dick Duncan 1 Zellers, SE NE NE 34-3s-5e, pumped 210 bbl., 10 per cent water, pumping 180 bbl., old well deepened from 3,359 ft. to 3,420 ft.

Hall Jordan 2 Deerhake, SE NW NE 34-3s-5e, flowed 1,134 bbl., est. 3,000 gal. acid, McClosky 3,305-21 ft., T.D. 3,399 ft.

Hoodville pool: McBride 1 L. O. York, NW NE SE NE 34-5s-6e, pumped 34 bbl. from Aux Vases and Benoist, Aux Vases 3,056 ft., old well deepened from 2,973 ft. to 3,060 ft.

Exchange 17 Friel-A, NE NE SE 34-5s-6e, pumped 116 bbl., 15-qt. shot 3,042-46 ft., 5-qt. shot 2,946-49 ft., 10-qt. shot 2,952-58 ft., Aux Vases 3,035 ft., T.D. 3,046 ft.

Sinclair-Wyoming 18 M. Friel-C, SW SE SW 34-5s-6e, swabbed 551 bbl., 5-qt. shot 3,062-65 ft., Aux Vases 3,052 ft., T.D. 3,068 ft.

Exchange 1 J. F. Morris, SE SE NW 27-5s-6e, dry, T.D. 3,280 ft.

### Jackson County

Wildcat: F. R. Dunne et al 1 Baum, SE NE SE 12-9s-4w, location abandoned.

### Jasper County

North Boos pool: Pure 1 L. E. McClane, E½ SE SE 8-6n-10e, flowed 326 bbl., 5,000 gal. acid, pay 2,780-85 ft., Fredonia 2,777 ft., T.D. 2,810 ft.

West Liberty pool: Pure 1 W. Kermickle-C, E½ NW NW 4-5n-10e, pumped and flowed 227 bbl., 5,000 gal. acid, 5,000 gal. reacid, pay 2,785-90 ft., 2,793-99 ft., Fredonia 2,783 ft., T.D. 2,825 ft.

Pure 2 Rohr Consol., W½ SE NE 5-5n-10e, flowed 229 bbl., 2,000 gal. acid, Aux Vases 2,670 ft., saturation 2,673-80 ft., 2,692-98 ft., T.D. 2,820 ft.

Pure 1 C. C. Byrons, E½ NW SW 8-5n-10e, flowed 399 bbl. in 16 hr., natural, 5,000 gal. acid, flowed 1,181 bbl. through 1-in. choke, Fredonia 2,796 ft., T.D. 2,830 ft.

### Marion County

Patoka pool: Adams O. & G. 3 Davidson, S½ SW NW NE 21-4n-1e, pumped 37 bbl. oil and 4 bbl. water, 30-qt. shot 1,428-45 ft., Benoist sand 1,423-45 ft., T.D. 1,445 ft.

East Patoka pool: Shell 1 G. M. Davidson, NE NE NE 34-4n-1e, pumped 87 bbl., 13-qt. shot 1,358-64 ft., 4-qt. shot 1,353-58 ft., Cypress sand 1,342-55 ft., T.D. 1,737 ft., P.B. 1,365 ft.

Schoenfeld et al 1 Stevens, SW SE SE 27-4n-1e, pumped 15 bbl., 15-qt. shot 1,359-65 ft., 15-qt. reshot, Cypress sand 1,536 ft., T.D. 1,370 ft., P.B. 1,362 ft.

Schoenfeld et al 2 Stevens, W½ SE SE 27-4n-1e. pumped 35 bbl., 10-qt. shot 1,357-62 ft., Cypress sand 1,356½ ft., T.D. 1,362 ft.

Highland Oil 1 Thalman estate, SW NW NW 35-4n-1e, pumped 140 bbl., 20-qt. shot 1,348-54 ft., Cypress 1,343-57 ft., T.D. 1,357 ft.

Fairman pool: Shell 1 C. A. Adams, SE SE SW 7-3n-1e, pumped 89 bbl. oil and 14 bbl. water, Benoist sand 1,465-71 ft., T.D. 1,471 ft.

Salem pool: Texas 21 E. Tate, NE NW NW 5-1n-2e, pumped 54 bbl., 3,000 gal. acid in Devonian, T.D. 3,655 ft., P.B. 3,620 ft., drilled out to 3,633 ft.

Texas 8. E. Hays, NE NW NW 32-2n-2e, flowed 302 bbl., 1,000 gal. acid, 1,000 gal. reacid, 5,000 gal. reacid, Trenton 4,450 ft., old well deepened from 3,355 ft. to 4,578 ft.

### Montgomery County

Wildcat: Keith 1 Varner, NE SE SW 3-8n-5w, dry, T.D. 674 ft., P.B. 646 ft.

### Richland County

Noble pool: Shaffer et al 1 M. F. Pflaum, S½ SE NW 33-4n-9e, pumped 81 bbl., 70 per cent water, 26-qt. shot 2,610-20 ft., Cypress sand 2,615-26 ft., T.D. 3,010 ft.

Dundas pool: Pure 2 Varner Consol., W½ SW SW 30-5n-10e, dry, T.D. 2,900 ft.

### Scott County

Wildcat: A. L. Bedwell 1 E. C. Adams, NW SE SW 27-13n-13w, dry, Silurian 202 ft., Maquoketa 335 ft., Trenton 518 ft., St. Peter 875 ft., water, T.D. 1,050 ft.

### Wabash County

Maud pool: L. B. Jackson 1 E. Alka, NE NW SE 34-1s-13w, pumped 50 bbl., natural, Waltersburg 1,933 ft., T.D. 1,955 ft.

J. W. McCummings 1 Grundon, NW SE NE 34-1s-13w, pumped 175 bbl. oil and 15 bbl. water, 3,500 gal. acid, McClosky 2,626-30 ft., 2,634-40 ft., T.D. 2,640 ft.

Allendale pool: G. Hayes et al 1 N. Y. Cent. R. R., SE SE NW 1-1n-12w, pumped 117 bbl., 40-qt. shot 2,028-40 ft., Benoist 2,026-42 ft., T.D. 2,042 ft.

Markham Drig. 1 Dale Hopkins, NW NW SW 6-1n-11w, dry, Menard 1,419 ft., Waltersburg sand 1,501 ft., Vienna 1,530 ft., Tar Springs 1,538 ft., Tar Springs sand 1,542 ft., Glen Dean 1,662 ft., Hardinsburg 1,689 ft., Hardinsburg sand 1,709 ft., Golconda 1,755 ft., Barlow 1,837 ft., Cypress 1,849 ft., Cypress sand 1,939-58 ft., Paint Creek 1,973 ft., Benoist 2,004-15 ft., Renault 2,091 ft., Aux Vases 2,100 ft., Ste. Genevieve 2,131 ft., McClosky 2,166 ft., T.D. 2,339 ft.

Joe Young 9 S. J. Stillwell, N½ NW NW SE 1-1n-12w, pumped 30 bbl., 15-qt. shot 2,102-12 ft., Benoist 2,002 ft., T.D. 2,012 ft.

Mount Carmel pool: Hall Jordan 1 F. Hein, SW SW NE 20-1s-12w, pumped 96 bbl., 20-qt. shot 2,045-59 ft., Cypress sand 2,039-59 ft., T.D. 2,059 ft.

Roberts 2 Crumen-Hudson, NW SW NW SE 20-1s-

12w, pumped 45 bbl., 10-qt. shot 2,055-64 ft., Cypress sand 2,046-54 ft., T.D. 2,064 ft.
L. B. Jackson 3 Jacques, SE NE NW 20-1s-12w, pumped 45 bbl., 30-qt. shot 2,062-74 ft., Cypress sand 2,059-74 ft., T.D. 2,074 ft.
O'Meara 5 E. Harris, SE SW SE SE 17-1s-12w, pumped 40 bbl., 15-qt. shot 2,042-52 ft., Cypress sand 2,042-52 ft., T.D. 2,058 ft.
J. C. Meyers 3 John Harris, SE SW SE 17-1s-12w, pumped 128 bbl., 15-qt. shot 1,555-64 ft., Biehl 1,454-1,546 ft., T.D. 1,564 ft.
Wildcat: F. A. Farrell 1 J. W. Price estate, SW SE NE 14-1n-12w, dry, T.D. 2,382 ft.
Harvey & Lobre 1 Strine, NW NE NW 13-1n-14w, dry, T.D. 2,993 ft.

**Wayne County**

North Enterprise pool: Sanders et al 1 H. G. Gill, SE NE NW 24-2n-7e, pumped 32 bbl., 5,000 gal. acid, McClosky 3,022-26 ft., 3,041-52 ft., 3,053-63 ft., T.D. 3,072 ft.
Boyleston pool: O'Meara 2 McLin, NE SW NE 9-2s-7e, pumped 55 bbl., perf. 3,151-61 ft. in Aux Vases, 500 gal. acid, perf. 3,187-93 ft., 3,195-98 ft. in Rosiclare, old well worked over, T.D. 3,282 ft.
Diamond-Half 1 L. H. Bunting, S½ NW SE 35-1s-7e, dry, Menard 2,418 ft., Glen Dean 2,653 ft., Golconda 2,736 ft., Barlow 2,837-47 ft., Paint Creek 3,004 ft., Aux Vases 3,154 ft., Ste. Genevieve 3,195 ft., Rosiclare 3,209 ft., Fredonia 3,265 ft., T.D. 3,340 ft.
Watkins Drlg. 2 J. Rossler, S½ NE SE 35-1s-7e, dry, Menard 2,446 ft., Vienna 2,557 ft., Glen Dean 2,685-2,700 ft., Barlow 2,864-72 ft., Paint Creek 3,034 ft., Renault 3,154 ft., Aux Vases 3,164 ft., Ste. Genevieve 3,199 ft., Rosiclare 3,219 ft., Fredonia 3,273 ft., McClosky 3,240 ft., T.D. 3,360 ft.
Weinert 5 Muhlback, NE SW NW 34-1s-7e, location abandoned.

**White County**

East Calvin pool: Cherry & Kidd 1 W. W. Gray-A, NE SE SE 8-4s-14w, pumped 158 bbl., 70-qt. shot 2,695-2,729 ft., Benoist 2,686-99 ft., T.D. 2,841 ft., P.B. 2,827 ft., old well deepened from 2,700 ft.
Tide Water 5 Evans, NE NW NW 4-4s-14w, pumped 136 bbl. from McClosky, natural, T.D. 2,912 ft.
Pruett & Carroll 3 Boltinghouse, SE SE NE 17-4s-14w, pumped 52 bbl., 50-qt. shot 2,832-49 ft., Aux Vases 2,826-44 ft., T.D. 2,849 ft.
Stroube Brothers 1 Boltinghouse, NW SE NW 16-4s-14w, pumped 45 bbl., 50-qt. shot 2,837-60 ft., Aux Vases 2,831-48 ft., T.D. 2,860 ft.
Buell & Herndon 8 J. Bond, SE NW NE 8-4s-14w, flowed 325 bbl., 100-qt. shot 2,802-27 ft., Aux Vases 2,798-2,831 ft., T.D. 2,831 ft.
Ryan 6 Bramlett-A, NW SE SW 17-4s-14w, pumped 65 bbl., 5-qt. shot 2,262-67 ft., Tar Springs sand 2,258 ft., T.D. 2,277 ft.
W. W. Gray 4-H fee, SE NE NE 20-4s-14w, flowed 300 bbl., 30-qt. shot 2,814-34 ft., Aux Vases sand 2,814-37 ft., T.D. 2,837 ft.
Skelly 4 Crossville, SE NW NE 20-4s-14w, pumped 20 bbl. in 8 hr., pumped off, perf. 2,585-94 ft., 60-qt. shot 2,830-99 ft., Aux Vases sand 2,828-49 ft., Cypress sand 2,585-96 ft., T.D. 2,849 ft.
Skelly 2 Daly, trustee, B, NW NE NW 20-4s-14w, pumped 80 bbl. oil and 20 bbl. water from Tar Springs and McClosky, 1,000 gal. acid, perf. 2,392-98 ft., Tar Springs 2,389 ft., McClosky 3,064-71 ft., T.D. 3,140 ft.
Babler Inv. 2-A F. M. Hon, SE SE SW 9-4s-14w, dry, Aux Vases sand 2,831 ft., Ste. Genevieve 2,865 ft., McClosky 2,977-84 ft., 60-qt. shot 2,833-63 ft., 1,000 gal. acid, pumped off, T.D. 2,984 ft.
West Irons pool: Wiser Oil 3 Chapman, SE NE SW 23-6s-8e, pumped 50 bbl. oil and 16 bbl. water, perf 3,111-18 ft., 3,076-82 ft., pay 3,035-41 ft., 3,075-82 ft., 3,111-18 ft., Ste. Genevieve 3,034 ft., T.D 3,189 ft.
Storms pool: Eason-Angle 7 Storms heirs, SW SE SE 14-6s-9e, pumped 50 bbl. oil and 50 bbl. water, 40-qt. shot 2,287-97 ft., old well deepened from 2,270 ft. to 2,303 ft.
Wildcat: Kingwood and Exchange 1 Porter, NE SW SW 12-7s-8e, pumped 36 bbl., Cypress sand 2,573-80 ft., T.D. 3,060 ft., P.B. 2,660 ft.
Hiawatha Oil 1 Stinson, SW SW NE 19-7s-11e, pumped 109 bbl., 30-qt. shot 2,118-28 ft., Tar Springs 2,109 ft., sand 2,114 ft., T.D. 2,128 ft.
Travis 1 Davis, SE SW NE 30-4s-9e, dry, T.D. 3,495 ft.

## ILLINOIS DRILLING REPORT

**Adams County**

C. Schachtsick 1 J. Tichart.....NE SW NW 12-2s-8w
Drilling 190 ft.

**Bond County**

Woodruff 1 Harwood.....NE NE SE 36-7n-4w
S.D. 800 ft.

**Clark County**

Neal Stewart 1 Wallis.....NW SW SE 8-10n-14w
S.D. 525 ft.

**Clay County**

R. E. Hanon 1 Newton.....SW SE SW SE 18-3n-5e
Set 10-in., waiting on cement.
A. R. Maddin 1 Ging.....SE SE NE 17-5n-5e
First report, Glen Dean 1,986 ft., Golconda 2,024 ft., drilling 2,148 ft.

**Edgar County**

Levy et al 1 Cookroft.....SW SE SE 11-12n-11w
Rigging up machine.

**Clinton County**

A. Niehoff 1 Fehrmann....N½ NW NW NE 23-1n-4w
First report, spud.
B. E. Martin 1 C. Heinzman.....SE SE SE 4-2n-1w
Set 12-in. 95 ft., S.D. 810 ft.
Hughes 2 Holman.....NE SW SE 10-2n-1w
S.D. 1,278 ft.
Wilson 1 Lippert.....NE NE NE 27-2n-1w
Drilling 1,000 ft.
Algona 1 Marshall.....SE SE SW 12-1n-1w
Drilling 2,950 ft.
B. E. Martin 1 Brinkmann....SW SW SW SE 9-1n-2w
Set 10-in. 778 ft., drilling 905 ft.
J. F. Ashoff 1 Lampen.....NW NW NW 16-1n-2w
Pumped 2 bbl. oil an hr. and 1 bbl. water a day, Cypress sand 1,105 ft., T.D. 1,110 ft., testing.
Obering et al 1 Yantis.....NE SE 27-3n-1w
Set 10-in. 75 ft., drilling 80 ft., first report.
P. Mosebach 1 Schlarmann.....NE NW NW 9-1n-3w
St. Peter 4,175 ft., T.D. 4,213 ft., P.B. to Devonian 2,450 ft.

**Effingham County**

Lynch & Jansen 1 J. Burk.....W½ SE NW 27-6n-5e
Rig, first report.

**Fayette County**

J. T. Elmore 1 Keith.....SE NE NW 18-6n-1w
Drilling 405 ft.
Turner Drlg. 1 Williams.....SW SW NW 6-6n-2e
Set 10-in. 560 ft., drilling 695 ft.
H. R. Spires 1 Braasch.....NE NE SW 1-5n-2e
Fishing 335 ft.
Texas 1 R. A. Helm.....SW NE SE 18-6n-3e
Location, first report.

**Ford County**

Nelson et al 1 Erp.....SW NW SE 19-24n-7e
Drilling 2,710 ft.

**Franklin County**

W. O. Morgan 1 J. P. Miner.....NW NW NE 36-6s-2e
Drilling 1,857 ft.
Bay Oil 1 Franklin County Coal ...SW SW NE 8-6s-3e
S.D. 1,365 ft.

**Gallatin County**

R. Halbert 1 Curry.....SW SW NW 15-8s-10e
Base Pennsylvanian 1,685 ft., Menard 1,878 ft., drilling 2,020 ft.
Duncan & Lester 1 E. A. Green ...NE NE NE 14-8s-8e
Rig, first report.

**Hamilton County**

Cameron Brothers 1 Hern.....NE NE SW 7-6s-7e
Set 10-in. 80 ft., Glen Dean 2,392 ft., drilling 2,398 ft.
E. S. Adkins 1 Federal Chem. & Coke.....NW NW SE 17-7s-6e
Moving in rotary tools.
Texas 1 K. Edwards.....NW NE NW 11-6s-6e
First report, moving in rotary tools.

**Jasper County**

Pure 1 A. A. Cunningham.....W½ SW SE 16-6n-10e
Set 8-in. 231 ft., drilling 2,168 ft.
C. L. Erbin 1 H. Garner.....SW NW SE 16-6n-8e
First report.

**Jefferson County**

Obering 1 Morgan.....NW SE SW 25-2s-1e
Swabbed 111 bbl. oil and show of water a day, putting on pump.

**La Salle County**

O. L. Greer 1 Sam Davis estate..SW SW SW 23-35n-2e
Drilling 180 ft.

**Lawrence County**

W. Payne 1 H. Payne.....NW SW NW 20-3n-11w
Drilling 1,300 ft.
R. R. Willis 1 W. H. Pinkstaff..NE NE SE 2-4n-11w
First report, 12-in. 23 ft., 8-in. 823 ft., drilling 835 ft

**Macoupin County**

Adams & Laegers 1 Bristow..SW SW SW NW 8-11n-7w
S.D. 1,225 ft.
Bridges & Valbert 1 Feiker....NW NE SW 1-9n-7w
Devonian 1,505-08 ft., slight show gas, H.F.W. 1,600 ft., S.D. 1,613 ft.

**Madison County**

Aich & Carroll 1 Rinkel.....SE NE NW 33-5n-6w
S.D. 855 ft.

**Marion County**

Romine 2 Bardee.....SW SE SW NE 33-3n-2e
Golconda 1,751 ft., Cypress 1,855 ft., Paint Creek 1,940 ft., Aux Vases 2,078 ft., Ste. Genevieve 2,135 ft., St. Louis 2,383 ft., drilling 3,310 ft.

**McLean County**

Funks Grove O. & G. 1 Crawford NW NW NW 28-22n-1e
Cleaning out 2,045 ft.

**Montgomery County**

O. A. Reed 1 England.....NE NW NW 19-10n-4w
Set 5-in. 775 ft., H.F.W. 790 ft., drilling 840 ft.
H. C. Detrick 1 W. H. Barnes..NW NE SE 20-10n-2w
Set 6-in. 1,185 ft., drilling 1,205 ft. in Paint Creek.

**Pulaski County**

R. G. Williams et al 1 W. L. Richey.....NE SE SW 9-15s-1e
First report, S.D. 300 ft.

**Randolph County**

J. R. Rankin 1 B. Bierman.....SW SW SE 3-7s-5w
S.D. 860 ft.

**St. Clair County**

S. C. Newhart 1 Miller.....NE NW NW 6-2s-7w
Location corrected, S.D. 10 ft.

**Shelby County**

J. Moore et al 1 fee.....NW NW NW 30-10n-3e
Location corrected.
Rose & Durbin 1 Flenner.....SW SW SE 9-10n-4e
Cypress sand 1,695 ft., rigging up standard tools and cleaning out, old well drilling deeper, old T.D. 1,702 ft., to deepen to McClosky.

**Tazewell County**

Bartlemay 1 Mathis.....SW NW SW 24-25n-3w
Drilling 945 ft.

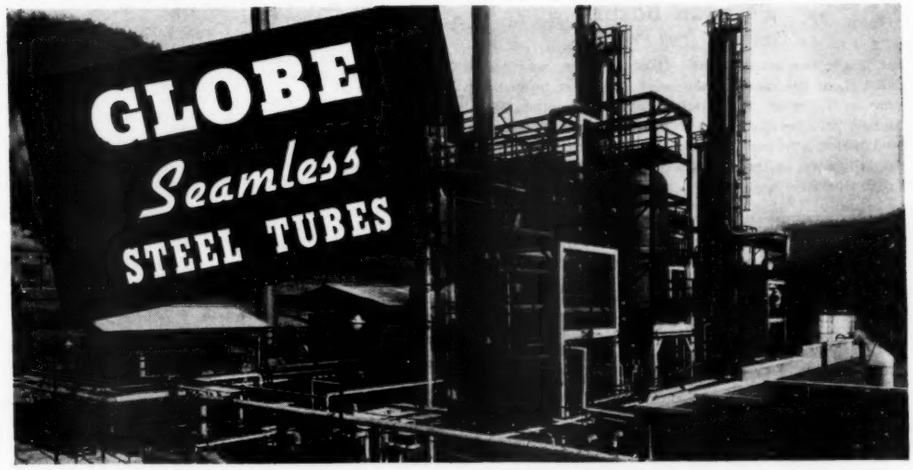
**Wabash County**

Geary Oil 1 McClain.....SW SE NE 36-2n-12w
Set 10-in. 127 ft., waiting on cement, first report.

**Wayne County**

Pure 1 T. R. Michels-A.....W½ SW NW 25-2n-7e
Clore 2,045 ft., Menard 2,243 ft., Glen Dean 2,448 ft., Hardinsburg 2,475 ft., base Golconda 2,622 ft., Cypress 2,633 ft., Cypress sand 2,636 ft., Paint Creek 2,792 ft., Benoist 2,845 ft., Aux Vases 2,898 ft., Ste. Genevieve 2,949 ft., Rosiclare 2,965 ft., Fredonia 2,996 ft., T.D. 3,065 ft., D.S. test 3,034-65 ft., open 1 hr., recovered 20 ft. oil and 60 ft. oil-cut mud, running casing.
Carter 1 Harrison-St. Ledger.....SE NW 34-1s-9e
Menard 2,394 ft., Waltersburg 2,438 ft., Waltersburg

*(Continued on Page 112)*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## CANADIAN FIELDS

# Production Up Due to Turner Valley Well and War Demand

By VICTOR LAURISTON

CHATHAM, Ont., Mar. 29.—Crude production from all Alberta fields in January totaled 754,384 bbl. or 24,335 bbl. a day, an increase of 1,990 bbl. a day over the December average. The increase over December was due to extra war emergency allotment and to completion of a new Turner Valley producer. Production from the various fields includes: Turner Valley, shallow crude, 642 bbl. from three wells; Turner Valley naphtha, 3,644 bbl. from 47 wells and Turner Valley limestone crude, 750,098 bbl. from 138 wells. Red Coulee light crude totaled 1,014 bbl. from seven wells; Wainwright heavy crude 831 bbl. from four wells, and other fields produced 4,036 bbl. from seven wells.

Natural-gas production for Alberta in January totaled 5,917,326,000 cu. ft. This included 1,995,989,000 cu. ft. from 72 Turner Valley gas wells and 2,867,732,000 cu. ft. from 138 limestone crude wells. In the Viking-Kinsella field, 19 wells produced 671,013,000 cu. ft.; in the Medicine Hat-Redcliff field 43 wells produced 318,919,000 cu. ft. and other fields with 15 wells produced 62,673,000 cu. ft.

Natural gasoline in Turner Valley totaled 27,969 bbl. recovered from 3,054,424,000 cu. ft. of gas, compared with 26,190 bbl. in December from 2,849,581,000 cu. ft. Natural gas burned or blown in air during the month totaled 2,655,537,000 cu. ft. This average of 85,662,000 cu. ft. a day now wasted compares with a wastage of as high as 500,000,000 cu. ft. a day before conservation measures were adopted.

Crude-oil stocks in Alberta on February 1 amounted to 481,951 bbl., an increase of 49,042 bbl. over January 1. Total petroleum stocks on February 1 were 1,448,943 bbl., an increase of 117,969 bbl. over January 1, but a decrease of 73,596 bbl. from February 1, 1940.

### Turner Valley Lime Tests

*NORTH TURNER VALLEY.*—Major Oil Investments 1, LSD 5, 34-20-3w5, below 6,494 ft. after getting the Madison at 6,406 ft.

*WEST CENTRAL FIELD.*—Anglo-Phillips 2, LSD 9, 35-19-3w5, finished at 7,749 ft., 479 ft. in the Madison, and is testing production.

Regal Royalties 1, LSD 14, 24-19-3w5, got the Madison at 7,777 ft. and is resuming after cementing around 7,790 ft. Independent Royalties 1, LSD 7, 24-19-3w5, below 8,035 ft., more than 280 ft. in the lime.

Okalta Oil 10, LSD 12, 18-19-2w5, is nearing completion below 7,909 ft., more than 400 ft. in the lime.

Royalite Oil 54, LSD 1, 7-19-2w5, finished at 7,367 ft., 431 ft. in the lime, is still testing, with completion held up by a jammed packer.

*(Continued on Page 109)*

## Permian Basin

*(Continued from Page 97)*

cat, 2½ miles southwest of Colorado City, was below 2,300 ft. at the close of the week. The test topped the lime at 1,330 ft. It is being correlated some 48 ft higher, structurally, than wells in the old Westbrook pool which produced from the 3,000-ft. level. The wildcat is located in the NE NE NW Section 50, Block 27, T.&P. Survey.

#### NORTHERN WEST TEXAS COMPLETIONS

(24-hour ratings based on last 3 hr. of 6-hr. gage)

**Andrews County**

Deep Rock field: Mascho Oil 1 University, 1,212 bbl., open tubing, 2,000 gal. acid, 4,262-4,320 ft.

**Cochran County**

Slaughter field: Magnolia 3 Woodley, 872 bbl., 3-in. casing outlet, 10,500 gal. acid, 4,935-92 ft.

**Gaines County**

Seminole field: Amerada 3 Lamb, 753 bbl., ½-in. choke, natural, 5,121-5,330 ft.
Amerada 6 Turlin, 662 bbl., ½-in. choke, 2,000 gal. acid, 5,184-5,308 ft., P.B. from 5,477 ft., T.D.
Wasson field: Continental Oil 7-45 Moore, 938 bbl., open tubing, 14,000 gal. acid, 4,910-5,050 ft.
Osage Drilling 1-B Willard, 825 bbl., ¾-in. choke, 1,000 gal. acid, 5,220-87 ft.

**Hockley County**

Slaughter field: Delta Drilling Co. 3-A Slaughter, 598 bbl., open tubing, 11,000 gal. acid, 4,871-4,973 ft.
Delta Drilling Co. 2-B Slaughter, 638 bbl., pumping, 10,000 gal. acid, 4,965-5,035 ft.
Honolulu Oil 3 Frazier, 2,231 bbl., open casing, 10,000 gal. acid, 4,940-5,018 ft.
Honolulu Oil 10-B-24 Slaughter, 1,537 bbl., open casing, 9,500 gal. acid, 4,930-5,000 ft.
Mid-Continent Oil 1-B Mallett, 665 bbl., ½-in. choke, 11,000 gal. acid, 4,967-5,032 ft.
Skelly Oil 1 Lincoln, 929 bbl., 3-in. casing outlet, 9,000 gal. acid, 4,910-5,005 ft.
Texas 15 Slaughter, 1,148 bbl., open casing, 11,000 gal. acid, 4,890-4,985 ft.
Western States Gasoline 8 Frazier, 2,415 bbl., 3-in. casing outlet, 9,500 gal. acid, 4,952-5,011 ft.

**Mitchell County**

Dockery-Robbins field: Judith Quinette Oil 1 Strain, 196 bbl., pumping, 425-qt. shot, 1,630-1,741 ft.
W. A. Wagoner 2 Fuller, 284 bbl., plus 2 per cent water, pumping, 475-qt. shot, 1,631-1,756 ft.

**Scurry County**

Sharon field: Coffield & Guthrie 4 Moore, 155 bbl., pumping, 380-qt. shot, 1,740-1,840 ft.

**Yoakum County**

Wasson field: Aloco Oil 12-B Miller, 871 bbl., open tubing, 10,000 gal. acid, 4,920-5,200 ft.
Aloco Oil 12-A Willard, 529 bbl., open tubing, 10,000 gal. acid, 4,900-5,196 ft.
Aloco Oil 1 Wooten, old T.D. 5,050 ft., deepened to 5,136 ft., new initial 1,640 bbl.
Argo Oil 9-A Comer, 837 bbl., open tubing, 11,000 gal. acid, 4,990-5,230 ft.
Continental 7-A Stevens, 723 bbl., open tubing, 12,000 gal. acid, 4,960-5,040 ft.
Don Danvers 13 Willard, 381 bbl., open tubing, gas lift, 9,500 gal. acid, 5,060-5,246 ft.
Don Danvers 16 Willard, 144 bbl., plus 4 per cent water, 32/64-in. choke, 10,000 gal. acid, 5,075-5,280 ft.
Don Danvers 2-B Willard, 1,374 bbl., open tubing, 10,000 gal. acid, 5,060-5,290 ft.
Humble 16 Bennett, 590 bbl., ⅞-in. choke, 7,000 gal. acid, 5,045-5,265 ft.
Mabee Oil & Gas 2 Kiel, 813 bbl., open tubing, 10,000 gal. acid, 5,150-5,285 ft.
Magnolia 26 Mahoney, 617 bbl., 40/64-in. choke, 6,000 gal. acid, 4,977-5,185 ft.

#### NORTHERN WEST TEXAS WILDCAT REPORT

**Andrews County**

Phillips 1 University-Drews, NW NE Sec. 32, Blk. 10, University Lands Sur., drilling 6,788 ft.
Furham Pet. 1 Lockhart-Brown, Sec. 24, Blk. 42-A, P.S.L. Sur., T.D. 5,600 ft., P.B. 4,558 ft., treated 1,000 gal. acid, retreating 2,000 gal. acid, flowed 100 bbl. fluid in 24 hr., 2 per cent b.s. and w., still testing.
Mascho Oil 1 Fisher, NE NE SE Sec. 16, Blk. 36-A, P.S.L. Sur., first report.

**Borden County**

M. L. Richards 1 W. R. Dunn, SW NE Sec. 307, Blk. 97, H.&T.C. Sur., 3,200-ft. test, location.
B. C. Mann 1 Canning & Reynolds, NW NE Sec. 151, Blk. 25, H.&T.C. Sur., 3,000-ft. test, location.

**Cochran County**

George Livermore 1 Wright, old T.D. 4,997 ft., S.D. 6,621 ft.

**Gaines County**

Amon G. Carter 4-D Wasson, NW SE Sec. 50, Blk. AX, P.S.L. Sur., logged new pay about 6,610 ft., tight well, application filed to drill to 11,000 ft., S.D. 10,078 ft.

**Hale County**

Humble 1 Byrd, SE SE NE Sec. 17, Blk. K, E.T.R.R. Sur., 9,000-ft. test, location.

**Hockley County**

Magnolia 1 M. Wilson, SW cor. Labor 8, Lge. 41, Maverick C.S.L. Sur., 1½ mi. N of production in Slaughter field, drilled broken oil shows 4,850-70 ft., top anhydrite 2,150 ft., top salt 2,240 ft., top solid lime 4,020 ft., T.D. 4,955 ft., tested 1,000 gal., preparing to retest through perf. from 4,909-29 ft.

**Lubbock County**

A. L. Henderson 1 W. D. McMillan, SE NW Sec. 4, Blk. 2-D, H.E.&W.T. Sur., location.

**Martin County**

Magnolia 1 N. D. Teague, NW NW Lab. 10, Lge. 260, Borden C.S.L. Sur., 5,500-ft. test, top anhydrite 1,930 ft., top brown lime 3,930 ft., solid lime 4,345 ft., drilling 6,231 ft.

**Mitchell County**

C. E. Casebolt 1 J. E. Franklin, NE NE NW Sec. 50, Blk. 27, T.&P. Sur., 15½-in. 170 ft., 12½-in. 256 ft., drilling 2,300 ft.

**Yoakum County**

George Livermore 1 Ownby, NE NE NE Sec. 502, Blk. D, Gibson Sur., drilled broken saturation 5,237-85 ft., flowed several heads oil, treated 3,500 gal. acid, flowed 121 bbl. daily, tested 2,360,000 cu. ft. gas daily, drilling 5,352 ft.

## SOUTHEAST NEW MEXICO

HOBBS, N. M., Mar. 31.—A new wildcat test is being started in Lea County and just 6 miles west of the town of Lovington and 8 miles northeast of the nearest production which is the Vacuum field.

The test is James W. Brown, Inc., 1 State, center of Lot 11, 4-16-35. It is 4,620 ft. from the south and 1,980 ft. from the west lines of the section. Contract depth is set at 5,300 ft. and pits and cellar have been dug. Humble, Shell and Skelly are all reported to be supporting the wildcat with cash contributions.

#### SOUTHEAST NEW MEXICO COMPLETIONS

**Eddy County**

Shugart field: Carper, Keohane & Saunders 4 McFadden, NW NE 3-19-31, flowed 150 bbl. daily, open tubing, 50-qt. shot, 2,645-65 ft.

**Lea County**

Eaves field: Continental Oil 1-B-19 Sholes, SE SW 19-25-37, flowed 12,000,000 cu. ft. gas daily, natural, 2,850-2,945 ft.

#### SOUTHEAST NEW MEXICO WILDCAT REPORT

**Chaves County**

L. E. Elliott 1 State ..... NW NE 16-11-31
S.D. repairs at 3,780 ft.
Roxana Oil 1 Maull ..... NE NW 11-12-25
Setting 8¼-in. at 624 ft., last report.
A. F. Pierce 1 Franks ..... SE NW NW 17-9-5
T.D. 990 ft., P.B. 887 ft., shot 40 qt. 864-87 ft., testing.
Holmes-Martin 1 Stephens ..... C NW NE 22-15-29
Old well drilling deeper, T.D. 3,210 ft.
H. Steinberger 1 Headley ..... NW SW 26-14s-29e
T.D. 3,405 ft., sulfur water 3,400-5 ft.
R. T. Wilson 1 L. B. Brown ..... C NW SW 29-11-23
T.D. 890 ft., last report.

**Eddy County**

Harry W. Long 1 Anderson ..... N½ 16-22-20
Location.
G. M. Cone 1 Hare ..... NW NW NE 11-16-28
Old well drilling deeper, T.D. 1,830 ft., showing est. 250,000 cu. ft. daily, testing.
Mac T. Anderson 1 Brainard ..... NE NE 28-18-27
T.D. 2,415 ft., last report.
Jack Harris 1 Josey ..... SW SE 19-20-23
T.D. 643 ft.
Jones & Yates 1 Everest ..... NE SE 15-18-26
270-qt. shot 1,934-84 ft., and 670-qt. shot 1,485-1,710 ft., set new casing, still testing.
Olen F. Featherstone 1 Johnson ..... SW SW 10-19-27
Location.
J. H. Rives 1 Boulter ..... SW SW SW 21-19-27
Location.
Basin Oil 1 Kimmell ..... NE NE NE 5-20-26
1,620-ft. test, T.D. 505 ft., reaming casing.
W. A. Suddreth 1 N. H. Wills, 6 mi. W of Getty field, NW SE 14-20-28, gas sand 778-83 ft., tested 7,000,000 cu. ft. daily, trying to cement casing at 638 ft. after braden head blew off, gas volume increased to 11,000,000 cu. ft. daily, S.D. at T.D. 738 ft., prepare to drill plug and complete.

## TEXAS PANHANDLE

AMARILLO, Tex., Mar. 31.—Two new wildcat or semiwildcat locations were announced for the Texas Panhandle area the past week, one each in Wheeler and Gray counties. The Wheeler County wildcat is Alma Oil 1 J. A. Welch, Section 7, Block B-A, H.&G.N. Survey, 2 miles west of the town of Twitty.

In the vicinity of Pampa in Gray County another semiwildcat test will be drilled. It is to be about 1 mile south of the city limits of the town and just northwest of a producer completed for 225 bbl. a short time ago. The test is 1 G. Cole, Section 104, Block 3, I.&G.N. Survey.

Completions for the week totaled 10, there being five each in Gray and Hutchinson counties. There were no gas wells completed the past week.

#### TEXAS PANHANDLE COMPLETIONS

**Gray County**

Warner Oil 4 Morse, 23 bbl. daily, 3,098 ft., T.D.
Magnolia 43 Fee Land 227, 118 bbl. daily, 3,084 ft., T.D.
King Oil 9 Vollmert, 216 bbl. daily, 3,107 ft., T.D.
Southern Petroleum 13 Vaughn, 155 bbl. daily, 3,118 ft., T.D.
Phillips 6 McKinney, 77 bbl., 3,109 ft., T.D.

**Hutchinson County**

J. M. Huber Corp. 13 Weatherly, 776 bbl., 2,987 ft., T.D.
Benonine Oil 9 Starnes, 231 bbl., 3,010 ft., T.D.
Holmes & Holmes 9 Moore, 321 bbl., 2,993 ft., T.D.
Phillips 31 Cockrell, 190 bbl., 2,893 ft., T.D.
Skelly Oil 13 Watkins B, 85 bbl., 2,884 ft., T.D.

# Westwego Test Opens a New Sand and Extends Field East

By F. L. SINGLETON

NEW ORLEANS, La., Mar. 31.—An increase in activity in the Westwego area, Jefferson Parish, is anticipated following the completion of Reese E. Carter 1 Craven et al which opened production from a new sand and extended the field approximately ¼ mile east. The well was drilled to a total depth of 9,755 ft., and 7-in. casing was cemented the previous week after an electrical survey showed favorable indication in a sand section at 8,993-9,036 ft. Casing was perforated at 8,990-98 ft., and at the close of the week the well was flowing at the estimated rate of 5 bbl. of fluid per hour of which 4 per cent was drilling mud and 96 per cent 35.3-gravity oil. Working pressure was 1,800 lb. The present test was made following a test at 9,006-10 ft. where the well flowed drilling mud and salt water with a slight show of oil.

This area was opened shortly after the first of the year by Titanic Oil Co. 1 Marrero Land & Investment Co., which was originally completed at 9,830-42 ft. However, the well was recently abandoned after several attempts to shut off the salt water failed. The area is located about 12 miles west of the city of New Orleans, near the Mississippi River.

**SUMMARY OF COMPLETIONS**

| | No. | Bbl. | Footage |
|---|---|---|---|
| Oil wells: Fields | 10 | 2,429 | 64,917 |
| Total | 10 | | 64,917 |

The newly opened St. Gabriel field, Iberville Parish, was being extended approximately 933 ft. north as George Echols prepared to test 2-A Natalbany Lumber Co. after cementing 7-in. casing on bottom at 7,783 ft. The sand section was logged by an electrical survey at 7,776-94 ft., while top of the oil sand was logged at 7,782 ft. The electrical survey showed 130 millivolts porosity and 8 ohms resistivity. Correlated with the discovery well, the extension well is approximately 17 ft. structurally higher. Drilling is under way on two other operations, while a rig from the Westwego field is being moved to the field for 1 Louisiana Prison Farm, an outpost well located in 80-9s-13.

## Casing Run at Port Allen Discovery

On the Port Allen prospect, West Baton Rouge Parish, Amerada Petroleum Corp. is running casing preparatory to testing 1 Wilberts Sons Lumber & Shingle Co., reported the previous week as a possible pool opener. The hole is bottomed at 10,044 ft., and 5½-in. casing is expected to be cemented on bottom. This well attempted to blow out after topping a sand section at 9,981 ft. while an electrical survey is reported to have logged encouraging showings at intervals from 8,900-9,660 ft. (see The Oil and Gas Journal, March 27, 1941). Location is about 12 miles west of the University field in East Baton Rouge Parish in 26-7s-11e.

*PLAQUEMINES PARISH.*—Drilling continues below 11,000 ft. on two prospective pool openers being drilled by the Texas Co. In the Octave Pass area, 1 State in 32-20s-20e is drilling in shale and sand below 11,322 ft., while 1 State-Delacroix in 34-15s-14e, is drilling in sand and shale below 11,165 ft. While details of the core record of both wells are being withheld for the time being, electrical surveys are reported to have logged several feet of sand capable of producing in commercial quantities. Phillips 1 State in Bastian Bay is shut down at a total depth below 12,000 ft., and is expected to be abandoned after an electrical survey failed to reveal any shows of importance.

*ST. MARTIN PARISH.*—Distillate production from a new sand was opened on the north flank of the Section 28 dome, St. Martin Parish as Superior Oil Co. of California 1-B St. Martin Land Co. flowed 16 bbl. of 47.3-gravity distillate daily through a 9/64-in. choke from perforated casing at 10,052-94 ft. Working pressure was 3,300 lb., and the gas flow was gaged at 1,500,000 cu. ft. daily. This well is about 800 ft. north of the company's 1 Stuart, completed as a gas-distillate producer at the end of last year at 9,300 ft. During the week the discovery well was recompleted in a new sand at 8,906-48 ft. for an initial production of 175 bbl. of 48.6-gravity distillate per day through a 11/64-in. choke. Tubing pressure was 2,675 lb. The company is moving in material for 2 E. C. Stuart in the SW 20-9s-7e.

*IBERIA PARISH.*—In the Vermilion Bay field, Iberia Parish, Texas 5-B State in 20-15s-6e, just southwest of 4-B State is bottomed at 11,533 ft., and casing is expected to be cemented for a production test after an electrical survey showed sand with favorable indications at 10,960-80 ft.

## Thick Wilcox Logged in Deep Test

S. W. Richardson 2-D Haas, an exploratory test located in the Eola field, Avoyelles Parish, is plugging back from a depth below 11,000 ft. preparatory to testing in the regular Wilcox pay at 8,500 ft. This well penetrated 3,005 ft. of Wilcox formation, and the following "kicks" were made in sand section below the regular producing horizon: 8,776-90 ft., 9,704-20 ft., and 10,150-62 ft. This is believed to be the deepest well in the Gulf Coast area to log this much section of the Wilcox formation.

Additional Wilcox activity was reported for the district as preparations were made to start two wildcats in the northern part of Rapides Parish. Chambles & Pitts are building road to 1 Eota Realty Co. in 12-4n-3e, while in 6-5n-3e, the same operators have derrick up for 1 Lee Lumber Co.

*LOWRY AREA.*—Tenative location for another test in the newly opened Lowry area, Cameron Parish, has been made by Superior Oil Co. of California for 1 Calcasieu National Bank located about 3,200 ft. northeast of the discovery well in 16-12s-4w. In the same parish, and located south of the Grand Lake field, Superior 1 Miami Corp. is drilling in sand below 9,442 ft. Gas sand was logged by an electrical survey at 8,194-8,204 ft.

On the south flank of the Gueydan field, Vermilion Parish, Union Sulphur Co. is bottomed below 9,700 ft. and casing was cemented for a production test following an electrical survey which showed favorable indications. This is the first well to be drilled by the company in this area which was opened the past year by Fohs Oil Co. The completion of the well as a producer would extend production about 600 ft. southward.

### LOUISIANA GULF COAST COMPLETIONS

**Calcasieu Parish**

Sulphur field: Union Sulphur 877 fee, 98 bbl., pumping, perf. casing 5,304-10 ft., T.D. 5,490 ft.

**Evangeline Parish**

Ville Platte field: Continental 7 Bercier Deville, 160 bbl., ⅛-in. choke, perf. casing 10,100-32 ft., T.D. 10,950 ft.
Continental 1 Vidrine, 370 bbl., ¼-in. choke, perf. casing 10,100-20 ft., T.D. 10,281 ft.

**Iberia Parish**

New Iberia field: Texas 3 Decuir, 165 bbl., 9/64-in. choke, sand 3,764-3,817 ft., T.D. 3,818 ft.

**Iberville Parish**

Bayou Blue field: Navarro 4 Wilbert Minerals Corp., 20 bbl. open tubing, perf. casing 1,700-10 ft., T.D. 3,085 ft.

**La Fourche Parish**

Golden Meadow field: Texas 2 Deramee, 552 bbl., 5/32-in. choke, perf. casing 10,378-92 ft., T.D. 10,425 ft.
Texas 12 State-Catfish Lake, 54 bbl., ¼-in. choke, perf. casing 2,620-40 ft., T.D. 2,807 ft.

**Plaquemines Parish**

Potash field: Humble 49 Orleans Levee Board, 730 bbl., ¼-in. choke, perf. casing 8,010-35 ft., T.D. 8,636 ft.

**St. Mary Parish**

Charenton field: Goodwin & Lucy 5 Viguerie, 64 bbl. fluid, 35 per cent water, top sand 1,133 ft., T.D. 1,142 ft.

**Terrebonne Parish**

Caillou Island field: Texas 60 State, 216 bbl., ¼-in. choke, perf. casing 7,625-38 ft., T.D. 8,283 ft.

### LOUISIANA GULF COAST DRILLING REPORT

**Calcasieu Parish**

Gulf 1 Calcasieu National Bank, Hayes prospect, T.D. 9,200 ft., 9⅝-in. casing 9,200 ft., drilling plug.
Gulf 1 Miller, southeast flank Edgerly field, drilling shale 7,919 ft.

**Evangeline Parish**

C. & I. Drilling Co. 1 Evangeline Land & Mineral Co., Pine Prairie prospect, drilling shale 6,054 ft.

**Iberia Parish**

Gulf 1 Petit Anse Co., Avery Island salt dome, drilling in sidetracked hole 5,565 ft.

**La Fourche Parish**

Gulf 1 State-PP., Bay Marshand area, offshore from La Fourche Parish, 16-in. casing 16 ft.

**St. Mary Parish**

E. G. Bateman et al Foster, Franklin area, 38-15s-9e, drilling sandy shale 10,706 ft.
Humble 1 Marin, Bayou Sale prospect, T.D. 4,040 ft., running electrical survey.
Texas 1 State, Cote Blanche salt dome, drilling salt 3,577 ft.

**Vermilion Parish**

Phillips 1 Dugas, Erath field, drilling shale 8,975 ft.
Texas 1 Broussard, Erath field, drilling shale 11,604 ft.

## California Fields

*(Continued from Page 89)*

**Maricopa District**

Bankline Oil Co. 24-24 Sunset ..... 24-11n-23e
Drilling and coring sand and shale 2,897 ft. Elev. 970 ft. Kern County.

**Rio Vista District**

Amerada 1 Wilcox ..... 31-4n-3e
Building rig and roads. Sacramento County.

**Shafter District**

Continental 2-C Kern County Land ..... 35-27s-24e
Drilling in sandy shale 11,349 ft. Fishing D.P. Elev. 986 ft. Kern County.

**Vernalis District**

Standard 2 Blewett Comm. ..... 25-3s-6e
Preparing to spud. Elev. 62 ft. San Joaquin County.

## LOS ANGELES BASIN

The Inglewood field of Los Angeles County where deep Miocene production was proved up last year, with subsequent completion of a large flowing well, will soon be subjected to deep-zone exploitation and it is logical to assume therefore that production of oil and gas in this field will reach a relatively high level despite efforts to keep production curtailed in conformity with the curtailment program. The deep Sentous zone which, in contrast with deep zones in other parts of the state, is not so deep, has shown indications of substantial productivity and a relatively high gas-oil ratio. The gas angle may later be applied in this field in which event, as happened at Montebello, crude-oil production will be regulated by the amount of natural gas that can be utilized by the public utilities to advantage. The California gas-conservation law prohibits both surface and underground waste although the state has centered its efforts to date on surface waste as this is physically visible and does not make it necessary to bring in a number of questionable factors that might not be possible to prove and which would lead to extensive litigation.

The contention that surface waste of gas works to the disadvantage of other operators in a common pool by dissipating reservoir energy has been upheld on several occasions and courts have in general established certain limits they considered reasonable. A certain amount of tolerance is always allowed and the law is administered under temporary restraining orders or temporary injunctions, the violation of which is considered contempt of court and subject to the usual penalties for such violations.

Texas Co. has staked location for its first deep well in the Inglewood field and actual work will get under way within the next week or 10 days. This is the first of the majors to undertake offset requirements but it will only be the first as Tide Water Associated, Shell, Standard and other operators will soon get under way. When Federal Oil Co. secured its lease on the Ron C. Smith property out on the north dip of the Inglewood structure the landowner held out 5 acres surrounding his residence. This 5 acres has been leased to the Jefferson Oil Co. and derrick construction is already under way.

*ROSECRANS.*—Royalty Service Corp. defined the southerly limits of production early this week by completing 1 Stein pumping 120 bbl. of 36.9-gravity oil

daily from 7,915 ft. Production of this well is fairly clean but the lack of gas pressure indicates that the outer limits have just about been reached. In the Athens section of the Rosecrans field, operators are waiting to ascertain the outcome of drilling on 1 Howard Townsite of Southern California Petroleum Corp. This well, which is located a few blocks northwest of the Thorley deep-zone well that proved up the existence of a productive zone below previous production, is expected to be given an early production test as a water string is at present being run in. Many operators have felt that the most productive area is located northwest of the Thorley well and this should be determined as a result of the impending test on 1 Howard townsite.

### LOS ANGELES BASIN COMPLETIONS

#### Dominguez Field

Union 7 Austin ..... 32-3s-13w
Flowed 761 bbl., 32.1-gravity, 0.2 per cent cut, 592,000 cu. ft. gas. 24/64-in. bean. Pressures 650/400 lb. Elev. 63 ft. T.D. 7,206 ft. 5½-in. combination string 7,204 ft. Perf. 7,114-7,204 ft. 7,178 ft. 2½-in. tubing with packer 7,083 ft. Completed in eighth Callender zone of Miocene age. 28 days' drilling time. Los Angeles County.

Union 82 Callender ..... 29-3s-13w
Flowed 115 bbl., 32.6-gravity, 4 per cent cut, 81,000 cu. ft. gas. 19/64-in. bean. Pressures 100/300 lb. Elev. 69 ft. T.D. 7,759 ft. 5½-in. combination string 7,757 ft. Perf. 6,950-7,096 ft. 7,010 ft. 2½-in. tubing. Completed in eighth Callender zone. 69 days' drilling time. Los Angeles County.

#### Montebello Extension Field

Union 7 Wilcox ..... 2-2s-12w
Flowed 385 bbl., 36.9-gravity, 2 per cent cut, 480,000 cu. ft. gas. 33/64-in. bean. Pressures 100/500 lb. Elev. 258 ft. T.D. 7,705 ft. 7-in. water string cemented 7,400 ft., 79 ft. 4-in. liner 7,705 ft. Perf. 7,060-95 ft., 7,174-7,210 ft. 7,668 ft. 2½-in. tubing with packer 7,114 ft. Deepened from 7,640 ft. and completed in La Merced zone. Los Angeles County.

#### Wilmington Field

Union Pacific R. R. 30-E Harbor ..... 3-5s-13w
Flowed 79 bbl., 31.2-gravity, 0.2 per cent cut. 42/64-in. bean. Pressures 425/450 lb. Elev. 15 ft. T.D. 4,042 ft., P.B. 3,933 ft. 7-in. water string 3,521 ft. 426 ft. 4¾-in. liner 3,927 ft. 3,488 ft. 2½-in. tubing. Perf. 3,521-3,615 ft., 3,630-80 ft., 3,690-3,703 ft., 3,735-83 ft., 3,810-30 ft., 3,872-3,927 ft. 38 days' drilling time. Completed in Terminal zone. Los Angeles County.

Union Pacific R. R. 169 fee ..... 4-5s-13w
Flowed 231 bbl., 30.7-gravity, 2 per cent cut, 50,000 cu. ft. gas. 48/64-in. bean. 4¾-in. gravel-packed liner 5,456 ft. Perf. 5,008-5,119 ft., 5,263-5,307 ft., 5,408-64 ft. 4,972 ft. 2½-in. tubing. Completed in Ford zone. 48 days' drilling time. Los Angeles County.

Union Pacific R. R. 174 fee ..... 4-5s-13w
Flowed 220 bbl., 19.9-gravity, 3 per cent cut. 48/64-in. bean. Pressures 125/600 lb. Elev. 14 ft. T.D. 3,506 ft., P.B. 3,474 ft. 10¾-in. water string 2,697 ft. 804 ft. 5-in. gravel-packed liner 3,474 ft. Perf. 2,686-2,754 ft., 2,779-2,843 ft., 2,859-85 ft., 3,163-3,280 ft., 3,320-3,418 ft., 3,434-74 ft. 2,895 ft. 2½-in. tubing with lead packer on bottom. 28 days' drilling time. Los Angeles County.

#### Rosecrans Field

Royalty Service Corp. 1 Stein ..... 19-3s-13w
Pumped 120 bbl., 30.1-gravity, 5 per cent cut. Elev. 112 ft. T.D. 8,002 ft., P.B. 7,915 ft. 7-in. water string 7,610 ft. 2330 ft. 5½-in. liner 7,910 ft. Perf. 7,600-7,900 ft. 7,850 ft. 2½-in. tubing. Completed in O'Dea zone. 55 days' drilling time. Los Angeles County.

### LOS ANGELES BASIN OUTPOSTS OR DEEP TESTS

#### Dominguez Field

Union 79 Callender ..... 32-3s-13w
T.D. 12,720 ft. in basement Schist. P.B. 12,464 ft. Fish tubing. Los Angeles County.

#### Inglewood Field

Standard 3-1 L.A.I. ..... 17-2s-14w
Drilling sand and shale 9,795 ft., Miocene age. Los Angeles County.

R. R. Bush Oil Co. 1 Merchants ..... 8-2s-14w
Derrick built. Los Angeles County.

Jefferson Oil Co. 1 Smith ..... 8-2s-14w
Derrick built. Location not surveyed. Los Angeles County.

Texas Co. 1 Smith ..... 8-2s-14w
Location staked. Los Angeles County.

#### Rosecrans Field

Southern Cal. Pet. Corp. 1 Townsite ..... 12-3s-14w
Drilling and coring hard shale 8,380 ft. T. P. Pike Drilling Co. doing actual drilling. Los Angeles County.

### LOS ANGELES BASIN WILDCATS

#### Orange District

Associated 1 Olive-Orange ..... 19-4s-9w
Drilling 1,996 ft. sand and shale. Elev. 175 ft. Orange County.

#### Dominguez-Gardena District

Wood-Mellon 1 Wood ..... 31-3s-13w
T.D. 7,795 ft. P.B. 2,400 ft. Redrilled to 6,975 ft. Suspended. Los Angeles County.

Hiles Drilling Co. 1 Grant ..... 29-3s-13w
Pongratz Pet. Co. drilled to T.D. 7,666 ft. and abandoned in 1940. Cleaned out to 7,240 ft. Running liner. Los Angeles County.

## COASTAL DISTRICT

In past years it has been possible when estimating where future drilling might be anticipated to check various areas in the San Joaquin Valley and, judging by the numerous discoveries made in that area during the past 10 years, this has been the case. Now, however, one must consider the coastal district which comprises western Los Angeles County and Ventura, Santa Barbara and San Luis Obispo counties. The Newhall-Castaic region located in western Los Angeles County will soon become the most active part of the state and the results of drilling during the next few months will determine whether operators and prospectors will remain in that district or go back into San Joaquin Valley.

A few important discoveries in the Newhall-Castaic region will lead to a larger amount of prospecting and obviously this should lead to additional discoveries. Western Gulf Oil Co. has apparently found a new field in its try although the future importance of Oak Canyon remains to be determined. The coastal district has been relatively inactive for a number of years although independent operators have from time to time drilled comparatively shallow wells in search of production. It was not until a few months ago that operators began to recognize the productive possibilities of the Modelo which in the most favorable areas requires from 4,000 to 6,000 ft. of hole. This depth was not attained as a rule before Barnsdall Oil Co. discovered the Newhall-Potrero field and R. E. Havenstrite found a substantial accumulation on the Del Valle anticline.

Barnsdall Oil Co. had a number of Los Angeles County supervisors as guests when it spudded in its initial well on the jail farm property recently. They were guests of R. A. Broomfield, executive vice president, and W. C. Whaley, vice president. The company secured this property, which is located in the Newhall-Castaic region, from Los Angeles County as the highest bidder.

The property consists of about 2,500 acres which was purchased a number of years ago to relieve congestion in the county jail and to provide a farm to which could be sent suitable cases. When the Newhall-Castaic area got hot several months ago, Barnsdall and several other operators entered bids for a lease on the acreage involved. Barnsdall's successful bid was for a 25 per cent royalty of production and a cash bonus in addition to some further remuneration to come out of future production. The company also secured an option on a second parcel which can be exercised if desired upon payment of an additional amount. Barnsdall's bid, while it is substantially higher than other companies would go, is not as high as it seems as the bonus to be paid out of oil will not be paid unless commercial production is secured.

*SANTA MARIA.*—Union Oil Co. has completed 1 Fleisher in 31-10n-33w in the Santa Maria Valley field of Santa Barbara County but no gage has yet been taken. It should be good for about 500 bbl. daily. This well was held up with mechanical trouble for about 2 months which was occasioned by sand entering the hole and packing solid around the pump. Bottom of the hole is 4,822 ft. and a 5½-in. water string has been landed at 4,455 ft. The company has also completed 2 Stimson at Santa Maria Valley but this well has been slow in getting under way. It has been completed on the beam. Union's new refinery equipment, designed to crack heavy crude oil, will be in operation at the company's Oleum refinery in the San Francisco Bay region within another 60 days and will probably run on Santa Maria Valley crude along with other heavy crude oil.

This tends to indicate that Union Oil Co. will probably drill a number of new wells in the Santa Maria Valley field in addition to purchasing some production. The company has built up a considerable potential at Santa Maria and this oil will fit in nicely with present plans which call for cracking to the coke stage. Pacific Gas & Electric Co. has agreed to purchase the coke in accordance with an agreement signed a year or so ago. This coke will be utilized by P. G. & E. in the generation of electricity and will more than provide for Union's needs at the Oleum refinery. Excess electricity will be turned into existing lines of the Pacific Gas & Electric Co.

### COASTAL DISTRICT COMPLETIONS

#### Rincon Field

C. C. M. O. Co. 16-B Hobson ..... 8-3n-24w


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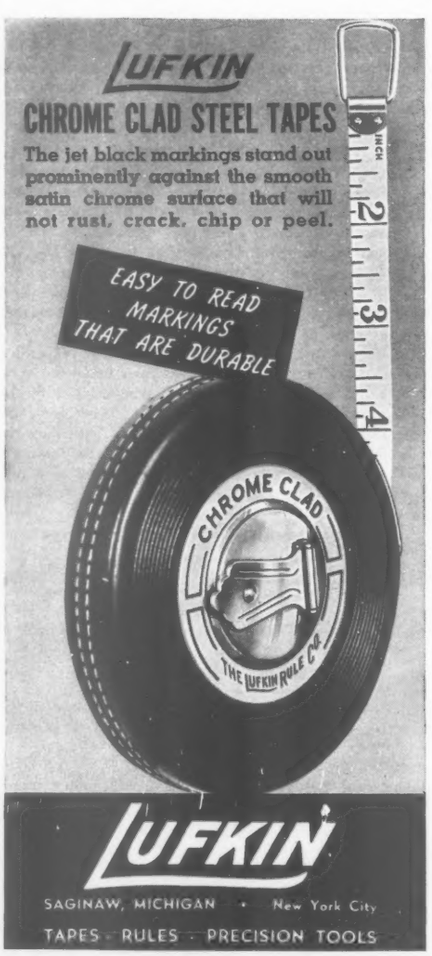


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**Ventura Avenue Field**

Associated 74 Lloyd ..... 27-3n-23w
Flowed 125 bbl., 29.6-gravity, 25 per cent cut, open line. Pressures 100/500 lb. Elev. 777 ft. T.D. 7,700 ft. 7-in. water string 7,300 ft. 440 ft. 5-in. liner 7,695 ft. Perf. 7,317-7,695 ft. 7,234 ft. 2½-in. tubing. Showed very little kick and very little gas. 77 days' drilling time. Ventura County.

Associated 36 V. L. & W. ..... 25-3n-23w
Flowed 3,600 bbl., 32.5-gravity, 2.3 per cent cut, 2,891,000 cu. ft. gas, 128/64-in. bean. Pressures with 8/64-in. bean 1,300/2,000 lb. Elev. 710 ft. T.D. 9,780 ft. 7-in. water string 9,205 ft. 621 ft. 5-in. liner 9,775 ft. Perf. 9,215-9,775 ft. 8,290 ft. 2½-in. tubing. Recompleted after being deepened from 9,316 ft. Ventura County.

Shell 31 Edison ..... 21-3n-23w
Flowed 377 bbl., 29.7-gravity, 2.6 per cent cut on compressor. Elev. 144 ft. T.D. 8,447 ft. 7-in. water string 7,710 ft. 4¾-in. oil string 8,439 ft. Perf. 7,716-7,936 ft., 7,974-8,190 ft., 8,226-8,439 ft. 8,191 ft. 2½-in. tubing. Completed in 57 zone. Ventura County.

## COASTAL DISTRICT WILDCATS

**Castaic District**

Barnsdall 1-17-A Honor rancho ..... 5-4n-16w
Drilling 1,198 ft. sand and shale. Los Angeles County.

Morse-Mangold 1 McDermott ..... 26-5n-17w
Rigging up rotary tools. Los Angeles County.

**Del Valle District**

R. E. Havenstrite 1 Vasquez ..... 21-4n-17w
Drilling sandy shale 6,480 ft. First Miocene zone tested wet 6,206 ft. Located SE of discovery well. Elev. 1,102 ft. Los Angeles County.

Universal Consd. Oil Co. 1 Dennis ..... 21-4n-17w
Rigging up. Elev. 1,006 ft. Los Angeles County.

**Goleta District**

Del Mar Oil Co. 1 Goleta ..... 11-4n-28w
Rigged up rotary drilling equipment. Santa Barbara County.

**Newhall District**

Aztec Oil Co. 1 Sanborn ..... 6-3n-16w
Preparing to spud. Elev. 1,516 ft. Los Angeles County.

H. T. Purman 1 Needham ..... 13-3n-16w
Grading road and location. Expect production around 1,500-1,600 ft. Elev. 1,681 ft. Los Angeles County.

Texas 1 Whitnah ..... 14-3n-16w
Building rig and roads. Located on major Pico anticline. Los Angeles County.

**Oak Canyon District**

Western Gulf 2 Lechler ..... 31-5n-17w
Rigging up. Contemplate deep test to lower Modelo. Elev. 1,489 ft. Los Angeles County.

Hathaway Co. 1 Ram ..... 31-4n-17w
Derrick erected. Elev. 1,369 ft. Los Angeles County.

## Canadian Fields

*(Continued from Page 106)*

### New Tests Starting

*WEST CENTRAL FIELD.*—Alberta Pacific Royalties 1, LSD 14, 6-19-2w5, spudded and below 300 ft.

Drillers & Producers 1, LSD 13, 7-19-2w5, working on cellar, on the former Pacific Petroleums 6 location. Drillers & Producers 2, spotted in LSD 12, same section. Royalite Oil 57 has location in LSD 2, same section.

*SOUTHWEST FIELD.*—Northwest-Hudson's Bay 6, spotted in LSD 7, 8-18-2w5, south and west of the most southerly producer in the field.

### Tests in the Foothills

*CLEARWATER.*—Ram River Oils 2, 1-37-11w5, in the Devonian lime below 2,600 ft. Clear Oils 1, LSD 8, 2-35-10w5, cementing casing for production test of oil showings between 1,326 and 1,333 ft.

*GREASE CREEK.*—Arrangements are being made for a new test close to Grease Creek-Northwest Co. 1, 13-29-7w5, abandoned owing to drilling difficulties at 7,020 ft. after encountering good oil and gas shows.

*MOOSE DOME.*—McColl-Frontenac Oil 1, LSD 6-23-6w5, testing at 5,092 ft.

*SARCEE RESERVE.*—Inland-Sarcee 1, LSD 2, 4-23-4w5, changing to rotary outfit to deepen from 1,265 ft. Inland-Sarcee 2 will be started with cable tools, probably in 33-22-4w5.

### Border Fields

*BLOOD INDIAN RESERVE.*—Northwest-West Petroleum 1, LSD 3, 20-5-23w4, deepening below 6,974 ft. to test the Devonian limestone. Test is now 854 ft. in the Madison lime.

*LETHBRIDGE.*—Lethbridge Petroleums 1, taken over by Brown Oil Corp. and associate interests, has resumed from 3,325 ft.

*TABER FIELD.*—Plains Petroleum 2, operated by Majestic Mines, is shut down after filling all available tankage with clear oil.

*STEVEVILLE FIELD.*—Standard of British Columbia 3 Princess, finished at 3,260 ft., has cemented 7-in. casing in the top of the Madison at 3,230 ft. and is perforating and testing production. Standard 2 Princess discovery well, LSD 3, 13-20-12w4, is making definite production test of the upper Madison, where preliminary tests indicated 520 bbl. a day with 12,750,000 cu. ft. of gas. Standard 4 Princess, LSD 13, 12-20-12w4, spudded and below 373 ft. Steveville Oils 1, LSD 5, 18-20-11w4, rigging.

*BARNWELL FIELD.*—Border Petroleum 1, LSD 5, 32-19-17w4, has resumed pumping after installing gas trap, and shows increased gas pressure and considerable oil with the water.

### New Tests in Ontario

*MIDDLETON TOWNSHIP.*—Dominion Natural Gas, Lot 24, Concession 4, South Talbot Road, rigging.

*WINDHAM TOWNSHIP.*—Dominion Natural Gas, north half Lot 23, Concession 13, location. Dominion Natural Gas, east half Lot 7, Concession 14, location.

## West Central Texas Fields

*(Continued from Page 95)*

Fain-McGaha 1 Cooper, SE SE SW Sec. 20, Blk. 15, T.&P. Sur., 4,000-ft. test, drilling 3,014 ft.

W. W. Fondren 1 C. P. Rogers, 126-acre tract in N½ Sec. 32, Blk. 18, T.&P. Sur., 3,100-ft. test, 15½-in. at 100 ft., drilling 1,020 ft.

Groover & Rose and Jones & Stasney 1 Owens, SE SE Sec. 46, Blk. 15, T.&P. Sur., 2,000-ft. test, spudding.

**Menard County**

W. F. Sorrell 1 Wilkerson, NW cor. Sec. 1549, C. A. Zimmerman Sur., Abst. 827, 4,000-ft. test, correction, 15½-in. at 190 ft., S.D. repair 300 ft.

**McCulloch County**

W. J. Willard 1 E. B. Garrett, 467 ft. from N and E lines of Sur. 934, Abst. 1196, 3,000-ft. test, T.D. 804 ft., preparing to quit as dry.

Clark 1 Lively, SE cor. Sec. 931, H. F. Hetzfeldt Sur., 650-ft. test, 7-in. 820 ft., cleaning out at 825 ft.

**Palo Pinto County**

Hickok Prod. and Reynolds 1 J. R. Halsell, 467 ft. from S and W lines, Sec. 92, B.B.B.&C. Sur., Abst. 105, 5,500-ft. test, drilling 3,002 ft.

W. K. Gordon 1 Noland, NE SE Sec. 86, Blk. 3, T.&P. Sur., 3,500-ft. test, drilling 2,690 ft.

**Shackelford County**

B. & F. Cotton Warehouse 1 Snyder, NE SW NE Sec. 32, L.A.L. Sur., 800-ft. test, location.

J. F. Baker and M. E. Daniels 1 Davis, SE NW Sec. 3, Blk. 13, T.&P. Sur., 1,700-ft. test, drilling 340 ft.

E. M. Doloach 1 Cook, SE SE NE Sec. 64, E.T. Sur., spudded.

Georgian Oil 2 Blach, 1,290 ft. from SE and 540 ft. from SW lines, Sec. 391, T.E.&L. Sur., spudded and S.D.

Ungren & Frazier 1 Elliott, NW NW Sec. 19, L.A.L. Sur., 850-ft. test, drilling 210 ft.

Glen Myers 1 Green, SE NW Sec. 68, Blk. 12, T.&P. Sur., 1,500-ft. test, location.

Cecil Young 2 Simpson, 630 ft. from E and 2,390 ft. from S lines, W½ Sec. 13, B.A.L. Sur., 900-ft. test, first report.

**Stonewall County**

Leader Oil 3 Carlisle, 2,136 ft. from N and 2,127 ft. from E lines of Sec. 292, Blk. D, H.&T.C. Sur., 5,250-ft. test, location.

Shell 1 Rutherford, SE NE Sec. 144, Blk. 1, H.&T.C. Sur., top Ellenburger 6,189 ft., T.D. 6,239 ft., salt water, S.D.

**Taylor County**

Ce-Beth Oil 1 City of Abilene, south shore of Lake Abilene on city property, 4,000-ft. test, T.D. 2,480 ft., top lime 2,443 ft., show oil 2,453-78 ft., fishing 2,605 ft.

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# Another Good Producer Nears Completion at Wertz Dome

By
T. R. INGRAM

DENVER, Colo., Mar. 31.—The Sundance sand discovery well on Wilson Creek, Colorado, Texas Co. and California Co. 5 Unit, swabbed and flowed at the rate of 400 bbl. a day on official gage. Thurman Oil Trust 1 Ruby, in Washington County, and South Park Oil Co. 1 Lemar, Park County, were abandoned. Both were wildcats.

Sinclair-Wyoming 18-A Wertz, Wertz field, Carbon County, Wyoming, flowed 5,000 bbl. a day at 5,989 ft., and will drill a little deeper before completing. Continental 24 Tom Bell, an edge well in Lance Creek, made 144 bbl. first 24 hours after acidizing with 7,000 gal. Enalpac 3 Cactus O.P.C.-1, Oregon Basin field, was completed for 600 bbl. initial.

Cut Bank had four completions, one a dry hole. Best well was Texas 1 Willis, which swabbed 307 bbl. first 24 hours. Montana Gas 1-X Nelson, wildcat, Toole County, was dry and abandoned at 2,220 ft.

## SUMMARY OF COMPLETIONS

**Colorado**

| | No. | Bbl. | Depth |
|---|---|---|---|
| Oil wells | 1 | 400 | 6,570 |
| Dry | 2 | ..... | 9,515 |
| Total | 3 | ..... | 16,085 |

**Wyoming**

| | | | |
|---|---|---|---|
| Oil wells: Lance Creek | 1 | 144 | 5,342 |
| Oregon basin | 1 | 600 | 3,408 |
| Total | 2 | 744 | 8,750 |

**Montana**

| | | | |
|---|---|---|---|
| Oil wells: Cut Bank | 3 | 497 | 8,756 |
| Dry | 1 | ..... | 2,855 |
| Wildcats: Dry | 1 | ..... | 2,220 |
| Total | 5 | ..... | 13,831 |

## COLORADO

**Boulder County**

J. A. Warren 3 Maxwell ...NW NE NW 24-1n-71w
Temporarily S.D. at 1,370 ft.

**El Paso County**

F. F. Hintze 1 State .....CEL SE SE 16-11s-60w
S.D. 1,840 ft.

**La Plata County**

E. B. Klem 1 Olbert.....NW SW 9-35n-12w
S.D. 4,050 ft., account weather.
Nick Spatter 1-X Bryce.....SW SW 31-33n-9w
Drilling 4,428 ft. in hard sand.

**Larimer County**

J. E. Carruthers 1 Hogsett.....NE SE NE 20-4n-69w
Spudded and S.D.
E. P. Gallup 1 Hanson .....C SE NW 36-10n-71w
S.D. 312 ft., prepare to resume.

**Las Animas County**

Barney Oil 1 Dutto-Marchisio....NW NW 32-33n-62w
Drilling 1,218 ft.

**Logan County**

West Plains 1 Sheldon.....SE NW SW 3-10n-55w
S.D. 3,415 ft., will change to rotary.

**Moffat County**

Mountain Fuel Supply 7 Wilson.....
NE SW NW 23-12n-100w
Cemented 7-in. at 2,563 ft., perf. opposite first and second Wasatch sands, preparing to test.
Mountain Fuel Supply 3 Musser .....
CNL NW SW 5-11n-97w
Drilling 3,241 ft.

**Park County**

South Park Oil Co. 1 Lemar, NE NE SE 34-11s-75w, South dome, Hartsel fold, is pulling casing to abandon at 7,725 ft., total depth. It is bottomed in the Apache Creek sand near the base of the Pierre. Top was at 6,910 ft. It had several good shows of oil and gas, but finally ran out of structure and at present depth tools were lost in the hole. At 1,501-65 ft. it bailed 2 bbl. of 52-gravity oil a day while drilling. Other shows in the Pierre shale at 4,070 ft. and 4,160 ft. bailed 10 to 15 bbl. a day. Oil shows continued at intervals, but there was no pressure behind them.

**Rio Blanco County**

Texas Co.-California Co. 5 Unit, NW NE NE 34-3n-94w, discovery in the Sundance at Wilson Creek, swabbed 90 bbl. and flowed 123 bbl. in 13 hours on final gage at 6,570 ft., total depth, through perforated 7-in. Top of sand was at 6,543 ft. It is a completion.

Texas Co. 6 Unit.....NW NE SE 27-3n-94w
Rigging rotary.

**Routt County**

Mid-Colorado Pet. 1 Omholt.... NE NE SE 29-4n-87w
T.D. 3,160 ft., testing Dakota shutoff.
Craig-Moore 1-X Erwin.....C SW NE 33-7n-85w
T.D. 2,675 ft., fishing for bit.

**Washington County**

Thurman Oil Trust 1 Ruby, NW NW SW 3-5s-52w, Thurman district, is reported abandoned without plugging at 1,790 ft., total depth. It was drilled with slim rotary and at 1,100-1,200 ft., in blue shale, it had a show of black oil through the mud, but no test was made. Objective was the Hygiene sand at the base of the Pierre shale.

## WYOMING

**Big Horn County**

McDonald & Curtis 1 Orchard....SE NW 24-51n-93w
S.D. 1,235 ft., weather.
N. B. Ketchersid 1 Mann.....SW SW SW 11-55n-97w
S.D. 625 ft. for 10-in. casing.

**Carbon County**

Sinclair-Wyoming 18-A Wertz, SE SE NW 7-26n-89w, Wertz field, is a near completion and will make another large well. At 5,972 ft. it flowed 4,010 bbl. in 23 hours. It was then deepened to 5,989 ft. where it flowed 5,000 bbl. in 24 hours through the drill stem. It will be deepened a few feet before completing. It is an east offset to 10-A Wertz, the discovery in the Tensleep, which made 75 bbl. an hour at 5,886 ft., and in 1939 was deepened to 6,161 ft. and flowed 300 bbl. an hour. It is a west offset to 15-A Wertz, which was completed in February for 2,094 bbl. at 6,103 ft.

Observers of the Wertz operation say that some of the wells completed in this field were capable of making around 10,000 bbl. a day had they been allowed to produce at capacity. It any event, the district is rapidly forging ahead to first place in new developments. In the week ending March 24, Lost Soldier, Wertz, Mahoney, and East Mahoney were estimated at 10,850 bbl. daily average, and 11,950 bbl. in the preceding week. Part of this oil is moving to the Parco refinery and part of it goes east to Missouri through the Stanolind trunk line. Shipments through the line to the eastern markets are reported to be running around 7,200 bbl. a day.

Ohio 13 State .....NW NE 34-20n-78w
Rigging up rotary, first report, Rock creek field.
Sinclair-Wyoming 22 Wertz.....SE SE SE 1-26n-90w
Spudded.
Sinclair-Wyoming 5-C Mahoney...C NW SE 34-26n-88w
Drilling 2,297 ft.
Ohio 12 State.....C W½ NE 34-20n-78w
T.D. 3,721 ft., swabbed 22 bbl. per hr. on 2-hr. test from Dakota, testing.

**Fremont County**

Indian Oil, agent, 2 Tribal.....SW SW NW 23-6n-2w
Drilling 405 ft.
V. M. Kirk 2 Tribal.....NW SE NE 22-6n-2w
Drilling 134 ft.

**Hot Springs County**

J. W. Bales 1 Government..CWL NW SE 21-42n-90w
T.D. 972 ft., P.B. to 900 ft., redrilling.

**Natrona County**

Investors Oil 31 Government. NW NW SW 2-33n-89w
Landed 7-in. on bottom at 2,338 ft.
K. S. Albert 1 Young..... NE SE 25-32n-82w
Drilling 310 ft.
Summitt Oil 2 Government . NW NE NE 21-33n-80w
T.D. 935 ft., running 8¼-in. to bottom.

**Niobrara County**

Continental 24 Tom Bell, NW NW NW 34-36n-65w, an outside well on the north in Lance Creek at a doubtful location, proved to be a well and swabbed and flowed 144 bbl. in 24 hours after acidizing with an aggregate of 7,000 gal., at 5,342 ft., total depth. The 7-in. was set at 5,285 ft. Main production was in the second Leo sand.

Ohio 7 Converse Sheep.....C NW SE 32-36n-65w
Drilling 5,071 ft., top Converse 4,678 ft.
Continental 1 Rohiff.....CSL SE NW 32-36n-65w
Drilling 4,758 ft. in lime, Converse at 4,612-40 ft.
Argo 16 Elliott.....NW SE NW 5-35n-65w
T.D. 5,540 ft., 7-in. at 5,534 ft., testing second Leo through perf. casing.
Continental 2-A Schuricht.....C SE NE 6-35n-65w
Drilling 5,460 ft. in lime, top second Leo 5,132 ft.

**Park County**

Enalpac Oil & Gas 3 Cactus O.P.C.-1, SW SE SW 5-51n-100w (corrected location), north dome, Oregon basin, an inside well, was completed in the Tensleep at 3,408 ft. for 600 bbl. a day through perforated 7-in. at 3,338 ft., after acidizing with 500 gal. The 7-in. was perforated with 94 holes at 3,265-3,320 ft. It is midway between 2 Pauline, on the east, completed in 1928 for 300 bbl., and 1 Cactus on the west, completed in 1928 for 1,000 bbl.

Enalpac 3 Pauline O.P.C.-1.....SW SE SE 5-51n-100w
Spudded.
Stanolind 6 Rosenberg.....NW NW NW 25-58n-98w
T.D. 2,747 ft., moving in heavier equipment to whipstock past tools.

**Sublette County**

North La Barge Oil 7 Govt. ....C SE NE 28-27n-113w
Location.
Charles Lackey 1 Government NE SE SW 33-27n-113w
Drilling 1,380 ft.
Marvel Oil 6 Government... CEL SE SE 28-27n-113w
Cemented 7-in. 1,125 ft., drilling plug.

**Sweetwater County**

Vermillion Oil 1 Government...SW NE NE 6-12n-99w
Location.
Sinclair-Wyoming 96-A.....NE SE NE 10-26n-90w
Drilling 3,115 ft.
Sinclair-Wyoming 95-A.....SW NW NW 11-26n-90w
T.D. 4,218 ft., 7-in. at 3,828 ft., flowed 75 bbl. in 2 hr. from Tensleep, testing.

**Uinta County**

Stove Creek Oil 2 Government C SW NW 26-14n-119w
T.D. 1,352 ft., fishing.

**Weston County**

Lem Johnston 1.....NW SW 24-44n-63w
Sidetracking casing below 3,300 ft., Mush Creek district.
John Brorphy 1 Hansen.....NW NE NW 13-44n-63w
Straightening crooked hole at 1,950 ft., Newcastle Terrace.
Updike Bros. 4.....CWL SW SW 30-46n-63w
Ready to spud, first report.
Riggs Oil 4 State.....CNL NE SE 16-46n-64w
Deepened from 3,210 ft. to top of Dakota at 3,435 ft.
Osage Trust 1 fee.....NE SW SE 10-46n-63w
Drilling 1,455 ft. in Minnekahta lime.
Al Jones 15.....NW NW NE 21-46n-63w
Spudded, first report.

## MONTANA

**Glacier County**

Cut Bank had four completions, one a comparatively large well, another average producer, a dry hole, and a small well.

Texas Co. 1 Willis, SW SW NE 19-32n-5w, swabbed 307 bbl. first 24 hours at 2,836 ft., total depth, from the Cut Bank sand at 2,797-2,833 ft. The main pay was at 2,823-29 ft., the oil rising 2,000 ft. in the hole. This well is in a district which has yielded some good producers in recent months. It is a north offset to Consolidated Gas 1 Frary-Tribal-191, which swabbed 569 bbl. initial, and an east offset to A. B. Cobb 3 Tribal-187, which swabbed 192 bbl. first 24 hours.

Consolidated Gas 1 Tribal, Lot 8, 10-34n-6w, swabbed 180 bbl. first 24 hours from the Cut Bank at 2,918-60 ft. Main pay was at 2,945-60 ft.

R. C. Tarrant 4 Wiley-Jones, SE NW SW 31-34n-5w, had a show of oil in the Sunburst at 2,780-95 ft. The Upper Cut Bank was at 2,805-30 ft. The lower member was absent. It was plugged and abandoned at 2,855 ft.

Santa Rita 2 Jacobson, C NW NW 17-33n-5w, had only 300 ft. of oil in the hole, and no swabbing test was made. Total depth was 2,960 ft. The Cut Bank was at 2,895-2,949 ft., with a shale break at 2,918-40 ft. It was shot with 40 qt.

A. E. Crumley 3 Allottee-113...NW NW SE 31-33n-5w
Spudded, first report.
Texas 2 Willis.....SW SW SW 20-32n-5w
Moving in, first report.

Glacier Production 6 Van Ormer, 330 ft. N of.... CSL SE 8-33n-5w
Drilling 900 ft., top Colorado 515 ft., 10¾-in. 530 ft.
Glacier Production 2 Land Bank.....
Drilling 620 ft., top Colorado 455 ft., 10¾-in. 498 ft.
A. B. Cobb 2 Tribal-187.....SW SW NW 19-32n-5w
Drilling 2,960 ft., and swabbing.
Santa Rita 3 Jordan.....C SE NE 7-32n-5w
Drilling 590 ft.
Ed Reagan 1 Tribal-194.....CEL SE NE 22-37n-7w
Drilling 3,750 ft. (correction).

**Hill County**

Cobb-Yale 1 Government.....C SW NE 19-37n-15e
Spudded and S.D., moving in rotary, Signal Butte.
Edwards-Callison 1 Hanson..CWL SW NW 25-35n-15e
Location, will go to Eagle sand at 1,200 ft. in search of municipal gas supply for Havre.

**Toole County**

The only completion was a dry hole in the Bow and Arrow district in Montana Gas 1-X Nelson, CNL SE NE 12-35n-1e, which was plugged and abandoned at 2,220 ft. after failure to find anything of value in the Cut Bank sand.

Two new operations were reported in Kevin-Sunburst.

Twinfields Oil 3 Govt. .....CNL NE NE 29-35n-3w
Drilling 310 ft., first report.
Colonel Kevin Oil 9 Govt. .....C NE NW 27-35n-3w
Spudded, first report.
R. G. Parrant 1 Holbrook.....C NW NE 2-36n-3w
Drilling 1,864 ft., small show gas in Sunburst at 1,833-61 ft.
Ohio 6 Howling.....SW SW NW 10-35n-2w
T.D. 1,573 ft., standing, 6⅝-in. cemented.
Ohio 7 Howling.....NE NE SE 10-35n-2w
Location.
Dunkirk Adventure 1 McKechnie NW SW SE 2-31n-1w
Cemented 12½-in. at 370 ft. (correction).
Kevin Oil 4 Leach .....C SE NE 31-35n-3w
T.D. 1,669 ft., cemented 7-in.
Pfabe & Engleking 13 Govt. ....CNL SE SE 19-35n-2w
T.D. 1,518 ft., acidized 500 gal., no results, will shoot and acidize again.

## NORTHWEST NEW MEXICO

**Bernalillo County**

David H. Boyd 1 Wright.....11-10n-5e
Drilling 187 ft.

**Sandoval County**

Sieman & Boyd 1 Armijo.....SE SW 1-12n-3w
T.D. 715 ft., show oil in sand topped at 711 ft., will run 8-in., location 6 mi. SE of Continental Oil Co. dry hole at 5,962 ft., in 2-13n-4w, drilled in 1935.

**San Miguel County**

Southwest Drilling, Inc., 1 Conchas NW NE 34-17n-21e
T.D. 2,735 ft., recemented 8-in. at 2,635 ft.

**San Juan County**

Carroll & Carroll 2 Government C NW NW 12-29n-12w
Drilling 1,610 ft.
Red Cactus Oil 1 Tribal.....SE SE SE 35-29n-18w
Drilling 1,500 ft., Dakota dry.

**Torrance County**

Cardinal Oil Co. 1 State..... SE SW 3-8n-14e
S.D. 100 ft., for casing.
Orville J. Lee 1 Milburn.....C NW SW 36-7n-7e
Drilling 590 ft.
J. P. Stewart 1 Laman.....C NW NE 3-3n-12e
T.D. 776 ft., skidded rig, drilling 100 ft. in new hole.

## UTAH

**Summit County**

Longwell Petroleum Co. 1.....SE SW SE 35-3n-5e
Drilling 3,645 ft.

## Oklahoma Fields

*(Continued from Page 92)*

brought the highest prices in 8 years at a sale in Pawhuska.

At Guthrie, the west outpost was H. L. Crisman and W. C. McBride 1 Eastwood, NE NW SW 7-17-1w, a little more than a quarter mile west of the discovery well, and the south outpost, about a mile from the discovery, was Big Chief Drilling and North American Oil 1 Belle Hirzel, NE NW SE 18-17-1w, a farmout from the Sun Oil Co.

The Osage Indian lease sale at Pawhuska reflected the recent interest in the area showed by independents and majors alike. A number of tests are already started on Osage lands, and at the sale last week A. G. Oliphant, Tulsa, paid $14,500 for the SW 11-24-10,, an 8-year high. Second highest price for leases was paid by the Phillips Petroleum Co. which bid $5,100 for the SE 10-23-7. The Texas Co. paid $2,200 for the NE 12-23-7. Most of the 18,035 acres sold were in quarter sections.

Another likely area was seen in Cimarron County where a survey showed that more than 200,000 acres of land have been taken on 10-year oil and gas leases. Pure Oil Co. has two large blocks in the county, one of 70,000 acres known as the Keyes block in Townships 6n-7e and 5n-7e and 5n-8e and 4n-8e and 4n-9e in the northeast part of the county. This block was taken by Carl Ford of Enid for the company. The second block is on the Watson Crossing structure and comprises about 15 sections in the east half of Township 5n-2e.

## OKLAHOMA COMPLETIONS

**Bryan-Marshall Counties**

Cumberland pool: Pure 2 Metz-105, NE SW NW 28-5s-7e, pumped 261 bbl. oil and 259 bbl. water, first sand 4,927 ft., second sand 5,040 ft., T.D. 5,091 ft., 7-in. 4,920 ft., 2½-in. 4,886 ft.
Pure 4 Little 106, NE NW NW 34-5s-7e, flowed 249 bbl. in 5 hr. through 1-in. choke, first sand 4,786 ft., drill-stem test 4,787-4,882 ft., 3,500,000 cu. ft. gas at 4,901 ft., 7-in. 4,886 ft., T.D. 5,077 ft.

**Caddo County**

Cement pool: Palmer Oil 4 Ulery, SW NW NE 34-6-10w, swabbed 664 bbl. potential, 7-in. 3,359 ft., T.D. 3,370 ft.

**Carter County**

West Hewitt pool: Porterfield 5 Walker, NE NW 20-4s-2w, pumped 120 bbl., T.D. 2,014 ft., 7-in. 1,936 ft., P.B. 1,980 ft., shot 1,944-72 ft.
Walter Neustadt 2 Choate, NW SE SE 10-4s-2w, flowed 780 bbl., sand 2,054 ft., 7-in. 2,038 ft., T.D. 2,127 ft.

**Creek County**

Deep Fork area: Tibbens 4-A Wilson, NW SW SE 18-4-9, dry, T.D. 1,386 ft., lower Layton 1,340-45 ft., 8-in. 1,304 ft.
Drumright area: Southern 1 Vernon, NW SE NW 20-19-8, pumped 8 bbl., pay zone 2,635-48 ft., shot, T.D. 3,756 ft. in Arbuckle, P.B. 2,647 ft.
East Stroud pool: Berry 2 Linihan, NE NE NE 31-15-7, flowed 150 bbl. oil and 3 bbl. water, Wilcox 4,084-95 ft., second Wilcox 4,106-28 ft., shot 4,097-4,128 ft., T.D. 4,128 ft., 5-in. 4,057 ft.
Mannford district: Curtis Oil 1 Coonrod, NE SE NE 9-19-9, pumped 35 bbl., Skinner 2,068-78 ft., T.D. 2,084 ft., shot.
Wildcat: Ray Starr 1-A Lumm, SE NW SE 8-14-8, 6,000,000 cu. ft. gas, T.D. 2,851 ft., P.B. 2,470 ft., rip casing 2,420-45 ft. and 2,464-70 ft., R.P. 615 lb.

**Garvin County**

Butterly gas field: Kerlyn 1 Butterly, NW NE SW 23-1-1, dry, T.D. 3,505 ft., cored sand with show oil 2,749-64 ft.

**Grady County**

Chickasha gas field: Oklahoma Natural 4 Edmundson, W½ SW NW 23-5-8w, 147,000,000 cu. ft. gas, R.P. 1,805 lb., Charlson 4,282-4,365 ft., sand 4,494-4,506 ft., show oil, T.D. 4,526 ft., 7-in. 4,502 ft., perf. 4,292-4,365 ft.

**Jackson County**

Altus pool: Doss 3 Robertson, SW NW SE 15-1-20w, flowed 92 bbl., T.D. 1,413 ft., 7-in. 1,357 ft.
Doss 1-A Robertson, NE NW SE 15-1-20w, dry, T.D. 1,605 ft., granite wash 1,323-27 ft. and 1,490-1,501 ft.

**Kiowa County**

Hobart pool: Argo 2 Ratliff, SW NE NE 19-7-17w, flowed 22 bbl. an hr. for 6 hr., conglomerate 900-43 ft., blew wild for 4 hr. with est. 10,000,000 cu. ft. gas and 10 bbl. oil an hr. at 952 ft. in limestone, 8-in. 950 ft., first oil sand 972-80 ft., T.D.

**Logan County**

Langston pool: Eason 2 Smith, NW NW 13-17-1w, old well P.B. from 5,119 ft., perf. 4,866-4,923 ft. (Woodford, Misener and Hunton), flowed 65 bbl. in 19 hr., 5,000,000 cu. ft. gas, acid, perf. 4,886-2,923 ft., acid, flowed 10 bbl. oil in 11 hr., 12,000,000 cu. ft. gas.
Lucien district: Champlin 10 Pfieffer, NW SE NW 4-19-2w, dry, old well P.B. from 5,091 ft. to 4,918 ft.

**Okfuskee County**

Dill pool: Titus 2 Miller, SW NE SW 35-12-8, dry, T.D. 3,762 ft., some water, Cromwell 3,746 ft., 5-in. 3,745 ft.
Titus 1 Miller, NW NE SW 35-12-8, dry, T.D. 3,712 ft., Cromwell 3,652 ft., 7-in. 3,651 ft.
Droppleman et al 3 Bill-B, NE SW SW 35-12-8, flowed 350 bbl., Cromwell 3,528 ft., 5-in. 3,524 ft., T.D. 3,568 ft., shot 3,548-68 ft.
Phillips 3 Miller, SW NE NE 34-12-8, flowed 182 bbl., cut 3 per cent water, Cromwell 3,672 ft., 5-in. 3,672 ft., T.D. 3,700 ft., P.B. 3,694 ft., shot 3,680-88 ft.
Wildcat: K.G.F.F. 1 Camp, SW SW SW 6-11-9, flowed 151 bbl. in 24 hr. through 5/64-in. choke, est. 2,500,000 cu. ft. gas, 43.5 gravity, 7-in. 4,008 ft., perf. Hunton 3,950-60 ft., T.D. 4,010 ft.

**Oklahoma County**

Wildcat: Clyde Dorr 1 Riley, NE SE 34-13-1, dry, T.D. 5,921 ft., first Wilcox 5,820 ft., Marshall 5,845 ft., second Wilcox 5,900 ft.

**Payne County**

Norfolk: Texas 2 Grass, SE NW 2-18-5, old well P.B. from 2,970 ft. to 2,760 ft., rip casing 2,700-25 ft., acid, 6 bbl.
Deep Rock 4 Laughlin, SW NW NE 2-18-5, old well P.B. from 2,715 ft. to 2,689 ft., rip casing 2,663-85 ft., est. 25 bbl., acid, flowed 50 bbl.
Wildcat: H. & H. Oil 1 Linsenmeyer, SE SE SW 3-18-4, dry, T.D. 3,956 ft., Misener, 3,930 ft.

**Pottawatomie County**

South Konawa: Parker 1 Fidler, SE NE NE 9-5-5, dry, T.D. 2,789 ft., Hunton 2,537 ft., Sylvan 2,777 ft.
St. Louis district: Vise 4 Richardson, NW SE SW 16-7-4, flowed 30 bbl., Senora lime 3,400 ft., sand 3,485 ft., 5-in. 3,487 ft., T.D. 3,526 ft., shot 3,500-26 ft.
Smith 2 Brown, SW SE NE 6-7-4, flowed 360 bbl. in 6 hr., Hunton 3,968 ft., T.D. 3,993 ft., acid.
Wildcat: Kerlyn 1 Johnson, NE SE SE 23-6-4, dry, T.D. 3,089 ft., Coal 2,846 ft., Senora lime 2,938 ft., Caney 3,065 ft.

**Seminole County**

Seminole townsite: Wood 1 Reardon, SE SW NE SW 28-9-6, flowed 28 bbl., T.D. 2,921 ft., Senora sand 2,870 ft., 5-in. 2,875 ft., shot 2,894-2,918 ft.
West Seminole: Amerada 2 Karr, S½ NE SW 30-9-6, pumped 118 bbl. oil and 52 bbl. water, Wilcox 4,220-60 ft., T.D., shot 4,230-58 ft., 7-in. 4,129 ft.
Wildcats: Blackwell 1 Boren, SW SE SW 34-6-6, dry, T.D. 3,564 ft., first Wilcox 3,293 ft., second Wilcox 3,547-64 ft.
Bryan Petroleum 1 Wisey, NE SE SE 5-11-8, dry, T.D. 3,702 ft., Cromwell zone 3,645 ft., sand 3,648-58 ft., cored dry sand.

**Stephens County**

Doyle pool: Clark & Cowden 11 Simpson, NW SE NE 11-1-5w, dry, T.D. 1,569 ft., sand 1,551-69 ft., P.B. 1,555½ ft., est. ½ bbl.
Wildcat: Gulf 1 Krieger, E½ NE SW 3-2-5w, dry, T.D. 6,271 ft., Dormick Hills 5,960 ft.

## OKLAHOMA DRILLING REPORT

**Cleveland County**

Gus Delaney et al 1 Montgomery..SE NW NE 13-7-2w
First report.
Luther Mayes 1 McCommins....NW NE NE 15-10-1
Rig.

**Coal County**

Ramsey 1 Harryman .....W½ SE NW 27-2-9
First report.

**Comanche County**

Bruce Runion 1 Whitehead ....E½ W½ NE 3-1s-13w
Drilling 130 ft.

**Cotton County**

South Port 1 Harris ..... NW NE 26-2s-13w
First report.

**Creek County**

L. B. Jackson 1 Prince.....SE SE NE 26-19-9
Lost City 815 ft., drilling 840 ft.
Bryan 1 Corbray..... NE NE NW 34-19-9
Mississippi lime 2,580 ft., drilling 2,633 ft.

**Garvin County**

Guy Hannum 1 Little .....E½ NE SE 16-3-1
First report.

**Hughes County**

Arrow Drlg. 1 Granneman.....SW NW SE 23-9-11
First report.

**Jackson County**

Fain Porter 1 Wilson.....SE SW 30-2-22w
First report (Arbuckle lime test).

**Jefferson County**

Jack Johnson 2 Bound .....NE NE SW 13-6s-6w
Drilling 560 ft.

**Lincoln County**

K. G. F. F. 1 Adams .....SW NW NW NW 3-14-4
S.D. 5,045 ft.
Morgan-Gulf Prod. 1 School Land..NE SW NE 16-12-5
10-in. 160 ft.

**Logan County**

Kerlyn 1 Wareing .....SW NE SW 33-19-4w
Drilling 4,164 ft.
J. E. Jones 1 Basserman .....SE NE SE 22-15-3w
T.D. 330 ft., 12½-in. 328 ft.

**Muskogee County**

Stormfeltz 1 Weimer .....NW SW NW 16-13-16
T.D. 100 ft., run casing.


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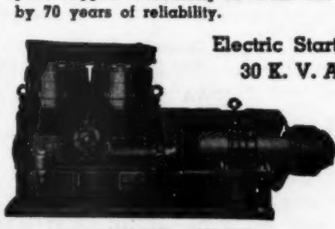

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WITTE ENGINE WORKS
KANSAS CITY, MISSOURI

Pine 1 Lacey & Steele .....SE NE NW 24-13-17
T.D. 435 ft., fishing.

**Okfuskee County**

Alma 1 Replogle .....NW SW NW 14-11-10
Booch 2,615-20 ft., drilling 3,740 ft.
J. O. Hayes 1 McKernan.....E½ SW NW 25-12-8
T.D. 4,084 ft., preparing to drill deeper and test Wilcox zone.
Texas 1 Butcher .....NW SE NW 15-12-9
Oswego 1,618 ft., Prue 1,665 ft., Inola 2,550 ft., salt bed 2,580 ft., Brown lime 2,790 ft., Booch 2,940 ft., Gilcrease zone 3,150-80 ft., Cromwell 3,300 ft., cored shaly sand with show oil and gas 2,949-59 ft., cored tight sand with good odor 3,306-17 ft., cored sand and shale show oil and gas 3,317-25 ft., drilling 3,400 ft.

**Oklahoma County**

Harper-Turner 1 Harper.....NW NW SW 17-14-2w
T.D. 5,925 ft., Chicken Farm sand 5,882 ft., run tubing.

**Okmulgee County**

Vierson & Cochran 1 Tilt .....SE SE SE 4-15-12
First report.

**Osage County**

W. R. Dillard 1 Osage .....SE NW NW 22-21-9
T.D. 832 ft., underreaming 8-in.
Superior Oil 1 Osage .....NW SE SW 23-22-8
Base Mississippi 2,853 ft., Hominy 2,851-71 ft., some show oil Arbuckle 2,921 ft., drilling 2,973 ft.

**Pawnee County**

Harwell & Burroughs 1 Isaacs...NW SE NW 28-21-8
Spudded 101 ft.
Dave Malernee 1-A Lucas.....NW SE NW 28-21-8
Layton 1,412-25 ft., odor Cleveland zone 1,670-1,868 ft., Skinner 2,280-2,300 ft. show gas, Bartlesville sand 2,444-2,540 ft., Mississippi lime 2,640 ft., first Simpson sand 2,844-56 ft. no show, second Simpson 2,866 ft., T.D. 2,877 ft., recovered fish, preparing to deepen.

**Payne County**

Crosbie 1 Hogle.....SE SE SW 29-20-2
Hoover 1,590 ft., Deer Creek 1,710 ft., upper Layton 3,130 ft., Oswego 3,850 ft.
Wood Oil 1 Daniel .....SE SE SE 15-19-3
Drilling 2,008 ft., 10-in. 115 ft.

**Pottawatomie County**

Hall-Jordan 1 Whitehead.....W½ SE SW 36-10-3
Drilling 3,245 ft.
Grisso & Eason 1 Royster.....SW NW NW 33-6-3
T.D. 3,753 ft., perf. 2,878-86 ft., bailed fresh water, perf. 2,869-78 ft., show gas, shut-in casing pressure 1,500 lb., est. 3,000,000 cu. ft. gas, S.I.
Hall-Jordan 1 Swan.....SE NE NW 29-6-5
Drilling 717 ft., 9⅝-in. 105 ft.

**Seminole County**

P. J. McIntyre 1 Brown.....SW SE NE 14-9-7
T.D. 4,337 ft., perf. Hunton 4,050-60 ft., swabbed 240 bbl. fluid in 4 hr., making lots of water, run packer on tubing.
Seiboldt 1 Boren.....SW SE SW 34-6-6
Dolomite 3,381 ft., T.D. 3,564 ft., electric log, no shows, first Wilcox zone 3,445 ft., second Wilcox 3,547 ft.
Mico 1 Davis .....NE NE NE 33-10-8
S.D. 3,513 ft.
J. T. Miller 1 Parsons .....SW SW NW 29-11-6
Belle City 1,865 ft., Hogshooter 2,220 ft., Checkerboard 2,680 ft., Oswego 3,030 ft., T.D. 3,730 ft.

**Stephens County**

Skelly 4 Frensley.....NE NE 35-1s-5w
Sylvan 5,216 ft., D.S. test 5,190 ft., open 30 min., recovered 180 ft. gas-cut mud, drilling 5,410 ft., shale.

**Tillman County**

Price 1 Crowe .....NW NW NE 24-2s-15w
Drilling 1,525 ft.

**Wagoner County**

Garrett 1 Kyle .....NW SE NE 10-19-15
S.D. 857 ft.

## Forest City Basin

*(Continued from Page 100)*

Ohio 1 Gerhardt .....SW SE SE 7-1n-16e
Hunton 2,283 ft., oil showing, cemented for test.
Black Gold 1 Smith.....C NW NW 31-3n-16e
Hunton 2,513 ft., T.D. 2,539 ft., oil rose 8 to 10 bbl. per hr., water content increased to 90 per cent, P.B.
Garetson & Knisely 1 Bankers Life SW SW 30-3n-16e
Hunton 2,515 ft., T.D. 2,521 ft., oil rose in pipe after drilling plug, acidized with 500 gal. and reacidized with 200 gal. under high pressure, waiting to test.
Guy Scott 1 Oswald.....C NW SW 15-2n-14e
Hunton 2,548 ft., oil showing, cementing pipe.
Palensky 1 Kalous.....SW SW 5-2n-13e
Hunton 895 ft., Viola 1,571 ft., Wilcox 1,853 ft. and dry, may P.B.

**MISSOURI**

**Ray County**

Robert Wells & Sons 1 Hoover C SW NW 9-54n-28w
Drilling at 320 ft.

**Platte County**

Missouri Valley G. & O. 1 Peret C NW NW 12-51n-34w
S.D. 615 ft.

**IOWA**

**Fremont County**

Ohio 1 Wisnom..... C NW NE 23-68n-41w
Setting surface casing.

**KANSAS**

**Leavenworth County**

McLaughlin Sons, Inc., 1 Thorp C NE NE 27-10s-20e
Ripped casing 2,088-90 ft., H.F.W., Arbuckle 2,163 ft., dry hole.

**Jefferson County**

McLaughlin Sons, Inc., 1 Bartlett Mortgage Co. ....
C SW SW 33-9s-20e
Drilling.
McLaughlin & Young 2 McLeod....NW SW 4-10s-20e
Drilling.

# MICHIGAN OPERATIONS

# Second Sylvania Sand Test Is Set for Adams-Arenac Field

By OTTO C. PRESSPRICH

SAGINAW, Mich., Mar. 31.—With 7 of the past week's 13 completions chalked up as dry holes and new production coming from small oil producers in four counties, there was little to change the discouraging outlook for Michigan.

Two producers were completed in Trowbride-Allegan, one in Bloomingdale-Van Buren, while other completions in the state's southwestern fields were dry holes, including an Alamo-Kalamazoo test, two others in Bloomingdale and one in Columbia-Van Buren. Ottawa's Tallmadge district witnessed a 10-bbl. producer completion.

**SUMMARY OF COMPLETIONS**

| | No. | Bbl. | Footage |
|---|---|---|---|
| Oil wells: Allegan County | 2 | 125 | 2,709 |
| Gladwin County | 1 | 30 | 3,861 |
| Ottawa County | 1 | 10 | 1,889 |
| Van Buren County | 1 | 40 | 1,248 |
| Gas wells: Isabella County | 1 | *2.2 | 1,292 |
| Dry holes: Kalamazoo County | 1 | ..... | 1,405 |
| Montcalm County | 3 | ..... | 5,794 |
| Van Buren County | 3 | ..... | 3,855 |
| Total | 13 | ..... | 22,053 |

*Million cu. ft.

Adams-Arenac, developing into one of the principal fields as older areas continue to decline in productivity, is scheduled to get its second Sylvania sand test. It is planned by Don Rayburn in 1 Fox, Section 21, ½ west of proven production, which got a bare show of oil in the Dundee at 3,150 ft. Rayburn intends a test to about 5,500 ft. Meanwhile, Pure Oil Co. 2-A State-Arenac, in Section 15, a mile north of the Fox, is below 4,700 ft. Rayburn has two Adams wells completing, one, the 1 Sonnenberg in Section 23, was being acidized, giving prospects of being good for nearly 200 bbl. a day. Acidizing also was scheduled for his 1-A Milne, Section 25, which showed a small natural flow.

Two failures balked efforts to extend the Belvidere-Montcalm Six Lake gas pool to the south, Belvidere Oil Co. recording two failures. The Buruss & Quinlan natural-gas strike in Deerfield-Isabella, was expected to result in a development program for that section this summer. The operators, who with associates have 3,000 acres under lease, are contemplating a Dundee oil test in the near future.

The Homer Fulton 1 Spencer, in Crystal-Montcalm, which held semiwildcat promise, was plugged. Too much water was the reason. Socony-Vacuum Oil Co. plans a test to the south of the Spencer and southeast of the old Crystal field.

State Conservation Department drilling permits were issued for 13 locations in seven counties, making 178 for the year. The week's list was divided, two each, to Osceola, Allegan, Isabella, and Gratiot, one each to Midland, Clare, Montcalm, Genesee, and Van Buren.

**MICHIGAN COMPLETIONS**

**Allegan County**

Trowbridge Township: H. L. Wheeler 1 Penshorn, NE NW NW 21-1n-13w, 60 bbl., acid, T.D. 1,348 ft.
Clapsaddle & Harris 1-A Beldon, SE SE NE Sec. 30, 65 bbl., acid, T.D. 1,361 ft.

**Gladwin County**

Beaverton Township: Whitehill & Drury 4 Cingano, NW SW NE 36-17n-2w, 30 bbl., acid, T.D. 3,861 ft.

**Isabella County**

Deerfield Township: Buruss & Quinlan 1 Winesburg, SE SW SW 20-14n-5w, 2,200,000 cu. ft. gas, T.D. 1,292 ft.

**Kalamazoo County**

Alamo Township: W. Spencer Cook 1 Mott, SW SW SW 2-1s-12w, dry, T.D. 1,405 ft.

**Montcalm County**

Belvidere Township: Belvidere Oil Co. 1 Chipman, SW NE SE 17-12n-7w, dry, T.D. 1,297 ft.
Belvidere Oil Co. 1 Ackley, SE SW NE Sec. 21, dry, T.D. 1,283 ft.
Crystal Township: Homer Fulton 1 Spencer, SW SW SW 13-10n-5w, dry, T.D. 3,214 ft.
Socony-Vacuum Oil Co., Inc., 1 Le Barre, SE SE NE Sec. 14, location abandoned.

**Ottawa County**

Tallmadge Township: Turner Petroleum Co. 5 White, SW SE SW 14-7n-13w, 10 bbl., acid, T.D. 1,889 ft.

**Van Buren County**

Bloomingdale Township: Lang & Lewis 1 Holmes, NW SE SW 15-1s-14w, dry at 1,256 ft.
Sprenger Brothers 1 Wiggins, SW NW NE Sec. 16, 40 bbl., natural, T.D. 1,248 ft.
C. C. Goff 1 Adkins, NE NW NW Sec. 23, dry, T.D. 1,325 ft.
Columbia Township: Globe Drilling 1 Love, SE SW SW 11-1s-15w, dry, T.D. 1,265 ft.

## Texas Gulf Coast

*(Continued from Page 101)*

**Polk County**

Humble 37-B Kirby Lumber Co., completed as salt-water disposal well after testing dry in 8,200-ft. pay, T.D. 8,260 ft.

**Wharton County**

Withers field: J. B. Ferguson 1 Halamicek, dry, T.D. 6,514 ft.
Texas 92-C Pierce, 121 bbl., ⅛-in. choke, top sand 5,338 ft., T.D. 5,379 ft.

**TEXAS GULF COAST DRILLING REPORT**

**Brazoria County**

Humble 6 Hubbard, Rowan field, William Harris Sur., drilling shale 8,550 ft.
Glenn McCarthy 1 R. H. Carr, Angleton field, drilling shale 10,100 ft.
Pure 1 Greenameyer, Manor Lake area, J. E. B. Austin Sur., drilling shale 5,068 ft.
N. Newton Rayzor 3 Christian, Chenango field, William Parker Sur., drilling shale 6,786 ft.
Stanolind et al 1 Alex Smith, Chenango field, SW of discovery well, William Parker Sur., first report.
Stanolind 1 Vleman, W of Chenango field, William Parker Sur., drilling shale and lime 5,140 ft.

**Hardin County**

W. G. Christian 1 Gueydry, SE of Batson field, M. Chavans Sur., drilling shale 7,205 ft.
Republic 1 Elliott fee, 1 mile S of Silsbee field, drilling shale 6,094 ft.

**Liberty County**

Charles G. Hooks 1 Locking, Spencer Kirkham Sur., drilling shale 8,075 ft.

**Matagorda County**

Skelly 1 Yeagley, Blessing field, H.&G.N. Sur., Sec. 2, drilling shale 6,997 ft.

**Waller County**

Humble 1-B American Rice Milling Co., NW of Katy gas field, H.&T.C. Sur., Sec. 79, first report.
Humble 1 Loucks, Katy gas field, H.&T.C. Sur., drilling shale 5,840 ft.

**Wharton County**

W. R. Davis Co., Inc., 1 Hartman, Lakeview area, I.&G.N. Sur., 10¾-in. casing 1,227 ft.
S. W. Richardson 1 J. T. Jones, S. P. Middleton Sur., 3 miles N of Louise townsite, first report, location.
Texas Progress 1 Sedlack, Glenflora prospect, W.C.R.R. Sur., T.D. 6,010 ft., W.O. after running electrical survey.

## Illinois Fields

*(Continued from Page 105)*

sand 2,455-2,530 ft., Tar Springs sand 2,551-2,665 ft., Glen Dean 2,675 ft., Hardinsburg sand 2,722-30 ft., base Golconda 2,892-2,900 ft., Cypress sand 2,962 ft., drilling 2,980 ft.

**White County**

J. Meyers 1 Hon.....NE SE SE 20-4s-14w
Drilling 2,365 ft.
Hiawatha Oil 1 Vail.....NW NW SE 19-7s-11e
Waltersburg 2,017 ft., Tar Springs 2,109 ft., T.D. 2,121 ft., 7-in. 2,109 ft., waiting on cement.
Jarvis Bros. 1 E. H. Morris....SW NW NE 20-5s-14w
Upper Kincaid 1,883 ft., lower Kincaid 2,101 ft., Menard 2,224 ft., Waltersburg sand 2,283 ft., T.D. 2,287 ft., circulating.
L. B. Jackson (was Buell & Herndon) 1 Parker....
SW NW NW 35-5s-10e
Rig.
Continental 1 Ackerman.....NE NW NE 25-5s-10e
West Franklin 514-39 ft., Bridgeport 1,340 ft., saturation 1,343-47 ft., base Pennsylvanian 1,941 ft., Menard 2,198 ft., Vienna 2,315 ft., Tar Springs 2,323 ft., Glen Dean 2,431 ft., Golconda 2,519 ft., drilling 2,549 ft.

**Williamson County**

Union Mining 1 Henderson.....SW SW NW 10-9s-2e
Spud.

# Wildcatting Gains; Grenada County Test Shows Oil

By GEORGE WEBER

JACKSON, Miss., Mar. 31.—Mississippi faces an upturn in wildcatting after several months of relative quiet in new exploration. New tests are scheduled for five counties in the near future, and more are reported planned. Tinsley continues at peak operations, with 17 rigs actively drilling this week.

## SUMMARY OF COMPLETIONS

| | No. | Bbl. | Footage |
|---|---|---|---|
| Oil wells: Tinsley.... | 6 | 5,006 | 30,069 |

As an added impetus to the revived wildcatting, a Grenada County wildcat is showing gas and oil. The Grenada County Drilling & Development Co. 1 Connecticut General Life Insurance Co., 28-23n-5e, near the town of Haserway is shut down while arrangements are being made to run an electrical survey. The test last week blew out briefly at 2,370 ft., sending mud and gas about 25 ft. into the derrick. As operators drilled into the top of the Tuscaloosa formation at about 2,630-50 ft. gas bubbles showed at several points.

A very soft sand was encountered at 2,697-2,715 ft. where operators reported a show of oil. Although the cuttings showed no stain, there was a definite odor of kerosene, it is reported. The electrical log will be watched with interest.

Elsewhere in the state, wildcats are drilling ahead in Clarke, Noxubee and Stone counties, and new tests are beginning in Lauderdale and Sharkey counties. Several other tests are scheduled for the near future. In Jones County, T. N. Smith, who has continued to pay rentals on his block, is believed planning a second test in Township 8n, Range 12w. The Perry County wildcat planned by Fred Courson has been delayed one month by bad roads, but may be expected to get under way late in April. A mile southeast outpost to production at Tinsley is planned by S. H. Killingsworth, and other wildcats are due in Leake and Stone counties.

### Tinsley

The addition of six new producers to the Tinsley field increases the potential production of that pool to over 60,000 bbl. daily. A limited outlet for crude has resulted in restricted flow, however, with the daily average production ranging between 17,000 and 18,000 bbl. recently. All new completions during the past week and nearly all current operations are in the south and southeast extension area, in which the Woodruff zone has revealed substantial reserves. Trading in leases and royalty in the area is brisk, and several new operators have begun drilling and producing in the field.

### Alabama and Southeastern

New activity is reported from the Southeast. In Alabama, three wildcats are currently active, two are temporarily shut down, and a sixth test is beginning. W. W. Newman is drilling 4 Nichols in Madison County, where he has previously encountered shows of oil and gas at shallow depths. Other shallow operations are continuing in Limestone County, where Shaw, Johnson & Thompson are drilling 2 E. E. Carter, 35-2s-5w. The test is reported to have a slight show of oil and gas and is temporarily shut down for a geological report.

Mellen & Gear are drilling again in 1 Alsobrook, a Bear Creek prospect abandoned last year at 1,048 ft. but now scheduled to be carried to 1,800 ft. The wildcat is located in Colbert County. A heavy rig is being moved onto B. L. Fillingame 1 Alabama Educational Association, Fayette County, which will resume operations shortly. The state's new deep test, Reid Clark 1 McWilliams, Wilcox County, is due to begin drilling this week.

In Georgia, the Dougherty County operations of Ellis & Hatten on the Reynolds Brothers Lumber Co. tract 18 miles southwest of Albany, will begin when rigging up is completed. Florida has been quiet for several months, but a recent transaction, whereby Oil, Inc., of Springfield, Ill., acquired an interest in the W. B. Blanchard block in Dade County, Florida Everglades, 40 miles west of Miami, points to renewed activity. The Blanchard 1 Everglades may be deepened, and the operator may attempt to complete No. 2 as a small gas well.

### MISSISSIPPI COMPLETIONS

**Tinsley—Yazoo County**

J. P. Evans 1 Dalzell Johnson, NE NW 31-10-2, 1,284 bbl., ½-in. choke, T.P. 220 lb., T.D. 5,090 ft., Woodruff zone 4,949-5,029 ft., 7-in. casing 5,080 ft., perf. 4,950-90 ft. and 5,000-20 ft.

Hassie Hunt 4 Stutts, SE SE 30-10-2, 960 bbl., ½-in. choke, T.P. 85 lb., T.D. 5,119 ft., Woodruff zone 4,965-5,054 ft., 7-in. casing 5,096 ft., perf. 4,966-5,012 ft.

W. B. Johnson Drlg. Co. 1-B Robertson, SW SW 20-10-2, 912 bbl., ⅝-in. choke, C.P. 25 lb., T.P. 95 lb., T.D. 5,101 ft., 5½-in. casing 5,097 ft., perf. 4,974-5,032 ft., Woodruff zone 4,974-5,085 ft.

Love Pet. Co. 1-A Tom Germany, NE NE 30-10-2, 720 bbl., 22/64-in. choke, C.P. 160 lb., T.P. 140 lb., T.D. 5,050 ft., 6-in. casing 5,049 ft., Woodruff zone 4,941-5,035 ft., perf. 4,941-90 ft.

Union Producing Co. 1-A Perry, SW NW 25-10-3, 438 bbl., 20/64-in. choke, T.P. 100 lb., C.P. 140 lb., T.D. 4,644 ft., Woodruff zone 4,596-4,622 ft., 7-in. casing 4,595 ft.

Union Producing Co. 2 J. R. Simms, NW SW 30-10-2, 692 bbl., ⅝-in. choke, T.P. 120 lb., C.P. 155 lb., T.D. 5,065 ft., 7-in. casing 5,061 ft., Woodruff zone 4,952-5,028 ft., perf. 4,995-5,027 ft.

### MISSISSIPPI DRILLING REPORT

**Clarke County**

Walsingham & Earles 1 School Lane, SW NW NE 16-4n-15e, drilling 4,011 ft. in shale and lime.

**Grenada County**

Grenada County Drlg. & Dev. Co. 1 Connecticut General, NW SE 28-23-5e, T.D. 2,715 ft., report very soft sand 2,697-2,715 ft., kerosene odor, arranging to run electrical survey.

**Kemper County**

A. E. Manning 1 McKelvain, NE SE 2-9-17, S.D., waiting on orders 1,475 ft.

**Lauderdale County**

Magnolia Pet. Co. 1 Culpepper, NW NE 4-8n-14e, set 13⅜-in. casing 601 ft., W.O.C. 801 ft.

**Noxubee County**

Hope & Thompson 1 Donahoo, NW 25-16-17, drilling 2,508 ft. in shale and streaks of lime.

**Sharkey County**

British American 1-A Houstan estate, N½ NE SW 23-11-7w, rigging up.

**Stone County**

H. I. Morgan 2 Dantzler Lumber Co., NE SE 4-4s-10w, drilling 7,415 ft.

**Warren County**

Waggoner Bros. Oil Co. 1 Parker, NW NW 17-14n-1e, T.D. 7,011 ft., S.D., W.O.

### ALABAMA DRILLING REPORT

**Colbert County**

Mellen & Gear 1 Alsobrook, S½ SW NW 10-4s-15w, drilling 1,475 ft.

**Fayette County**

B. L. Fillingame 1 Alabama Educational Ass'n., NW SW 3-16s-12w, T.D. 1,700 ft., rigging up heavier rig.

**Madison County**

W. W. Newman 4 Nichols, NE NE 2-6s-2e, drilling 223 ft.

**Wilcox County**

Reid Clark et al 1 R. F. McWilliams, NE NW SE 9-11-10, rigging up.

### GEORGIA DRILLING REPORT

**Wilcat—Dougherty County**

Ellis & Hatten 1 Reynolds Bros. Lumber Co., Land Lot 302, second land district, G. M. Dist. 620, moving in material.

## Rocky Mountain Runs

Production estimates for week ended March 29:

### MONTANA

| | Barrels |
|---|---|
| Kevin-Sunburst | 4,570 |
| Border | 40 |
| Cat Creek | 480 |
| Cut Bank | 12,200 |
| Pondera | 890 |
| Total Montana | 18,180 |

### WYOMING

| | |
|---|---|
| Salt Creek | 14,390 |
| Big Muddy | 1,190 |
| Badger Basin | 160 |
| Black Mountain | 100 |
| Byron | 1,350 |
| Cody Dome | 40 |
| Cole Creek | 720 |
| Dallas Derby | 320 |
| Dutton Creek | 60 |
| East Mahoney-Ferris | 210 |
| Elk Basin | 780 |
| Frannie | 3,180 |
| Garland | 1,930 |
| Grass Creek | 1,880 |
| Hidden Dome | 80 |
| Hudson | 240 |
| Iron Creek | 20 |
| La Barge | 1,890 |
| Lance Creek | 26,780 |
| Lost Soldier | 5,200 |
| Mahoney | 1,970 |
| Maverick Springs | 850 |
| Medicine Bow | 670 |
| Mule Creek | 360 |
| Oregon Basin | 5,980 |
| Osage | 600 |
| Poison Spider | 270 |
| Quealy Dome | 450 |
| Rock River | 2,550 |
| South Casper Creek | 410 |
| Teapot | 20 |
| Warm Springs | 70 |
| Wertz | 3,870 |
| Total Wyoming | 78,590 |

### COLORADO

| | |
|---|---|
| Iles Dome | 1,570 |
| Florence | 120 |
| Fort Collins and Wellington | 320 |
| Wilson | 920 |
| Moffatt | 340 |
| Greasewood | 30 |
| Rangely | 70 |
| Tow Creek | 160 |
| Price | 320 |
| Total Colorado | 3,850 |

### NEW MEXICO

| | |
|---|---|
| Arrowhead | 3,670 |
| Caprock | 40 |
| Cooper | 2,990 |
| Corbin | 60 |
| Eaves | 720 |
| West Eunice | 430 |
| Eunice | 17,960 |
| Halfway | 270 |
| Hardy | 2,810 |
| Hobbs | 9,660 |
| Jal | 380 |
| Langlie | 4,270 |
| Lynch | 410 |
| Lynn | 960 |
| Mattix | 4,740 |
| Monument | 18,480 |
| North Lynch | 20 |
| Penrose | 4,630 |
| Rhoades | 300 |
| Skaggs | 70 |
| Skelly | 1,840 |
| South Eunice | 2,570 |
| South Lovington | 1,330 |
| Vacuum | 12,600 |
| Artesia-Maljamar | 19,050 |
| Aztec-Bloomfield | 10 |
| Getty | 100 |
| Hogback | 200 |
| Rattlesnake | 310 |
| Table Mesa | 100 |
| Total New Mexico | 110,980 |
| Total Rocky Mountain region | 211,600 |

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# Personal Paragraphs

FRED WEST, Shreveport, La., operations supervisor for Westbrook, Thompson and Stewart of Fort Worth, Tex., has been transferred to Jackson, Miss.

A. J. WEIDEMAN, executive secretary fo the Oil and Gas Association of Michigan, has left the association for private business. The Mount Pleasant office of the association was closed April 1, and association activities are now concentrated entirely in Grand Rapids under active direction of HAROLD M. McCLURE, of Alma, and W. B. PARDOE, of Grand Rapids.

PARKER L. MELVIN, president of the Pennsylvania Grade Crude Oil Association, presided at a meeting of oil producers of southern Pennsylvania, March 27, at Washington, Pa.

B. G. SWAN, geophysicist for Continental Oil Co., Ponca City, Okla., addressed the Technical Club of that city last week on "Geophysical Methods of Exploration for Petroleum."

E. W. ISOM, vice president Sinclair Refining Co., New York, has been appointed to the A.P.I. Refining Division program committee for the current year.

FREDERICK C. BUCKWALTER has been made district engineer for the Lucien headquarters with Shell Oil Co., Inc., and is located at Perry, Okla.

J. A. LaFORTUNE and H. W. HARTS, vice presidents of Warren Petroleum Co., Tulsa, are vacationing in Florida. Mr. and Mrs. LaFortune are at Miami Beach, while the Harts are deep-sea fishing off Tampa.

J. D. TURNER has been transferred from Carter Oil Co.'s Mattoon, Ill., office to Comanche, Okla., replacing W. D. McBEE, who was called by the draft. Both are in the geological division.

R. H. BLAKELY, Wichita, Kans., zone agent for Shell Oil Co., Inc., will be transferred to Tulsa April 1 where he is to become assistant manager of the land department under H. W. PENTERMAN. The transfer was occasioned by resignation of C. R. WELCH. Before his assignment to Wichita, Mr. Blakely had been scout and land man for Shell at Ardmore, Okla.

C. Z. WEBB, formerly refinery superintendent of St. Helens Petroleum Co. which was closed down on January 1, 1941, has been appointed manager of the lubricating-oil department of Eagle Oil & Refining Co.

H. B. DUCHAND, of Republic Petroleum Co., has been elected president of the newly organized Petroleum Forum in Los Angeles, Calif. R. A. BROOMFIELD, JR., Barnsdall Oil Co., and G. S. FOLLANSBEE, of Universal Consolidated Oil Co., were elected vice presidents. D. P. MURDY, of Wilshire Oil Co., is corresponding secretary.

CHARLES W. DINGMAN, a former petroleum engineer for both the federal and provincial governments at Calgary, Alta., has been appointed to the Calgary staff of Home Oil Co.

H. W. HOLLAND, Texas Co., New York City, has been appointed chairman of the 1941 committee on marketing equipment of the American Petroleum Institute's division of marketing.

J. WALTER SAYBOLT, president of Penola, Inc., will retire August 1 after a 40-year career with Standard Oil Co. units. He is a son of GEORGE M. SAYBOLT, inventor of a viscometer.

W. B. MILLISON, formerly of Wichita, Kans., has joined with his brother, CLARK MILLISON, of Tulsa, in forming a new company called Oil Investment Co., with offices in the Beacon Life Building, Tulsa.

H. W. DODGE, vice president and general sales manager of Texas Co. with offices in New York, is spending some time on the Pacific Coast outlining the company's sales activities and advertising program. At the Los Angeles meeting D. E. BEATON, in charge of sales activities in Pacific Coast territory, presided.

## Do You Remember?

From The Oil and Gas Journal Files

### 25 YEARS AGO

Congress is all "upsot" over the oil situation. Oil is becoming a burning issue. Those senatorial gasoline investigators should send a committee to Oklahoma and interview the producers and refiners of oil here.

President Hashimoto, of the Hoden Oil Co., recently visited a well in the Nishiyama oil field, Japan, and as soon as he arrived it hit the pay and let go at the rate of 80 koku an hour.

The second deepest well in Oklahoma was abandoned at 4,180 ft.

Since the Great War began, Lane & MacAndrews' fleet of oil steamers has been reduced in number by the loss of three vessels.

### 20 YEARS AGO

From Capetown, a Reuters dispatch brings information to the effect that Royal Dutch-Shell has sent an engineer to the Transvaal where large quantities of oil-bearing shale have been opened up.

In Europe, according to a London correspondent, owners of American oil stocks are much mystified because stock prices are depressed. In America, many individuals, in a like manner, are perplexed.

On March 15, an entire trainload of gasoline left the refinery of the Owenwood Oil Corp. at Burkburnett, Tex. This train comprised 25 tank cars, every one loaded to capacity.

### 10 YEARS AGO

A California company lands and cements 6,763 ft. of 13⅜-in. pipe in North dome of Kettleman Hills—a world's record.

The Railroad Commission has prepared a Texas statewide oil-proration order to limit the state to approximately 676,000 bbl. and to bring the new East Texas field under proration.

Nebraska is still seeking oil after 40 years' vain quest.

A new 70,000-bbl. well is completed in Oklahoma City.

C. C. SPICER was reelected president of Republic Petroleum Co. at the annual election held in Los Angeles, Calif., during the past week.

DANA F. DETRICK, formerly with Diversified Royalties Co., is now a petroleum engineer for Wilshire Oil Co., Los Angeles, Calif.

C. M. LaLONDE has been promoted to assistant to the district superintendent for Phillips Petroleum Co., in Great Bend, Kans.

O. G. LEICHLITER has been made president of Mudge Oil Co., Pittsburgh, Pa. He was formerly vice president and general manager.

WILLIAM M. CORREA, Socony-Vacuum Oil Co., Inc., was reelected president of the New York Oil Trades Association at its annual meeting last week.

THOMAS BLACK, Anglo-Ecuadorian Oilfields, Ltd., Guayaquil, recently returned to the United States. Mr. Black was accompanied by Mrs. Black and Miss Eleanor Black.

GEORGE B. McCAMEY, Fort Worth, Tex., president of the Cordova Union Oil Co., is drilling a wildcat test in New Meridian County, southeastern Missouri. GEORGE STRAKE, Houston, Tex., operator, has two blocks in the general vicinity.

CHARLES D. VERTREES, Midland, Tex., district geologist for Continental Oil Co., has been chosen South Permian basin representative of the American Association of Petroleum Geologists. He succeeds RONALD K. DeFORD, district geologist of Argo Oil Corp.

THOMAS A. CREEKMORE, Tulsa, has retired as president of Summit Drilling Co. because of ill health. JOEL A. WOLFE has taken over the duties as president.

A. C. GALBRAITH, vice president of Union Oil Co., has resigned to enter the advertising field in which he was interested before joining the Union's executive staff.

C. L. PFOUTS of Nichols Run, Pa., has acquired the Eli Tarr estate interest in 22 producing wells on a 147-acre tract in Cattaraugus County, Pennsylvania, where he will inaugurate a secondary-recovery project.

FRANK PATTERSON, formerly of Midland, Tex., has become field engineer for the K.M.A. Pressure Maintenance Association, Wichita Falls, Tex. His specific duties include cooperation with operators in solving field problems.

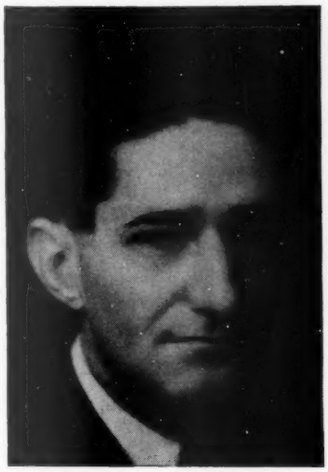
HARRY GRAHAM has been advanced from traffic manager of Standard Oil Co. of Louisiana to traffic manager of Standard Oil Co. of New Jersey. SAM SHORT has been advanced from assistant to replace Mr. Graham at the Standard Louisiana office.

T. G. MURPHY, chief chemist of the Franklin Creek Refining Co., New York, presided at a meeting of the Department of Standards and Tests, National Petroleum Association, held April 1 at Oil City, Pa. Mr. Murphy is chairman of the department.

C. V. MILLIKAN, chief petroleum engineer for Amerada Petroleum Corp., Tulsa, will conduct a 3-day lecture course April 16 to 18 in his capacity as special lecturer to the department of petroleum engineering at Texas A. & M. College. The lectures will deal with reservoir conditions in oil fields.

# Geology a Springboard

Geology has been the channel through which C. A. Warner, of Houston, Tex., has risen to high place in the executive department of the Houston Oil Co. Election of Mr. Warner to the board of directors of his company on March 17 this year is the most recent recognition given to his services which cover a period of 20 years.



*C. A. WARNER*

Technical writing and association work have shared with geological studies in Mr. Warner's career. He is the author of "Field Mapping for the Oil Geologist," "Texas Oil and Gas Since 1543," and numerous articles in various technical journals.

Association memberships are maintained in the A.I.M.E, A.A.P.G., American Petroleum Institute, and Independent Petroleum Association of America. He has held offices at various times in the first three associations. The student loan fund in the Gulf Coast section of the A.I.M.E., designed to assist engineering students in obtaining college educations, was sponsored and organized by Mr. Warner.

After graduating from Cornell University, Ithaca, N. Y., in 1917, Mr. Warner was immediately engaged as a field geologist for Empire Gas & Fuel Co. and assigned to Oklahoma and Kansas. He served a year as geologist in Oklahoma and Texas for Emerald Oil Co. in 1919-20 then returned to the Empire organization as district geologist for Oklahoma.

In September 1921, Mr. Warner was employed by Houston Oil Co. as district manager for the Mid-Continent. Eleven years later he was transferred to the home office at Houston and in 1934 he was made superintendent of the land department, a position he still holds in addition to the directorship. Mr. Warner was born in Jefferson, N. Y.

T. H. BARTON, president, Lion Oil & Refining Co., El Dorado, Ark., was a business visitor to the Gulf Coast district last week.

NELSON K. MOODY, vice president of Sinclair Prairie Oil Co., has been elected vice president of the Tulsa Community Fund.

KENNETH ACKLEY and E. S. CONWAY, geologists for Carter Oil Co. at Seminole, Okla., who were injured last week in an automobile accident, are reported recovering.

JOHN T. McCOY, New York, Tide Water Associated Oil Co., has been appointed a member of the refinery-technology committee of the American Petroleum Institute.

ALVIN RICHARDS, chief counsel for Pure Oil Co., Tulsa, last week was made honorary member of Phi Delta Phi, international legal fraternity. The initiation was made in a secret ceremonial in Tulsa.

ROBERT W. McDOWELL, vice president of the Mid-Continent Petroleum Corp., has been elected president of the Tulsa University Downtown Quarterbacks Club, an organization of business men to promote athletics.

JOHN D. CLAY, Houston, Tex., independent operator, has been made a director of the newly formed Hatchet Club in that city organized to promote good will and to disseminate facts, information and knowledge on any matter of educational nature.

HERMAN GUNTER, state geologist of Florida, gave a paper on the "Stratigraphy and Structure of Florida" before the Mississippi Geological Society recently at Jackson, Miss. He was accompanied by SYDNEY A. STUBBS, geologist for the Florida Survey, who entered into the discussion following the paper.

WALLACE E. PRATT, a director and member of the executive committee of the Standard Oil Co. of New Jersey, gave a series of four lectures on petroleum geology before students and the faculty of the departments of geology and petroleum engineering of the University of Kansas, March 17, 18 and 19. The subjects of his lectures were "Oil in the Earth," "Where Oil Is," "Who Finds Oil—And How," and "Oil and Human Culture." Mr. Pratt is an alumnus of the University of Kansas and a past president of the American Association of Petroleum Geologists.

Shifts: S. R. ALEXANDER, engineer, Texas Co., from Crowell, Tex., to Corpus Christi, Tex.; W. B. JANUARY, superintendent, Magnolia Petroleum Co., from Montell, Tex., to Sabinal, Tex.; R. E. HISSOM, superintendent, Taber & Coleman Drilling Co., from Shawnee, Okla., to Great Bend, Kans.; J. R. REEVES, geologist, Barnsdall Oil Co., from Morgan City, La., to Woodville, Miss.; S. M. MILLION, superintendent, R. L. Bauman Co., from Carmi, Ill., to Centralia, Ill.; A. J. ROGERS, geologist, Skelly Oil Co., from Tarkio, Mo., to Grant City, Mo.; WALTER C. PEARSON, engineer, Stanolind Oil & Gas Co., from Grass Creek, Wyo., to Midwest, Wyo.

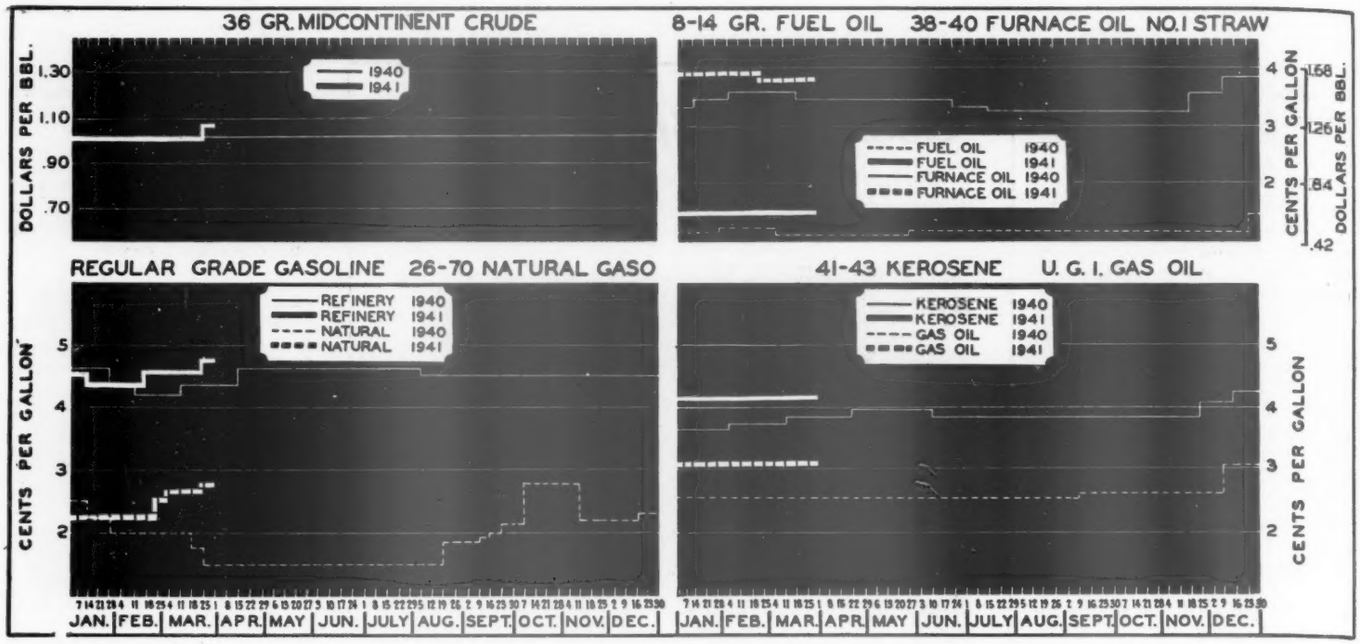
RALPH S. COOLEY, for the past 5 years in charge of the West Texas-New Mexico district for Sloan & Zook Co., Bradford, Pa., has resigned his position with that company and will open an office in Midland, Tex., for George P. Livermore, Inc. Mr. Cooley will act as assistant to Mr. Livermore, devoting most of his time to exploration activities.

HERBERT SPENCER, Standard Oil Co. of New Jersey, has been elected full-time president of the Asphalt Institute. His term began April 1. Vice presidents elected were J. A. BLOOD, Standard Oil Co. of California; J. F. LUCEY, Talco Asphalt & Refining Co., and H. B. PULLAR, Berry Asphalt Co. DAVID WAXMAN, Shell Oil Co., Inc., is treasurer, and GEORGE R. CHRISTIE, Socony-Vacuum Oil Co., is secretary.

LEO RANNEY, of McConnelsville, Ohio, will address a joint meeting of the Fort Worth Petroleum Engineers Club and the Fort Worth Geological Society at a dinner to be held on the evening of April 7. Mr. Ranney will talk on "The Drilling of Horizontal Oil Wells."

GEORGE W. NILSSON has been placed in charge of the petroleum and gas division of the Los Angeles Chamber of Commerce and WALKER S. CLUTE has been appointed chairman of the tax-regulation committee. HOWARD KEGLEY is chairman of the public lands committee.

D. E. McCULLOUGH, Darby Petroleum Co., Tulsa, has been elected general chairman of the Petroleum Charity Ball Association. HAROLD DURBIN, Warren Petroleum Co., is vice chairman; O. J. NELSON, Shell Oil Co., Inc., is treasurer, and BERNICE THOMPSON, Phillips Petroleum Co., is secretary. The association raises funds for the purchase of clothing for needy Tulsa school children.




**Representative Mid-Continent Quotations on Crude Oil and Refined Products, Basis Oklahoma (Group 3)**

# *Gasoline and Lubricating-Oil Prices Raised by Mid-Continent Refiners*

By H. STANLEY NORMAN

REFINERY gasoline, natural gasoline and lubricating-oil prices moved upward this week in the Mid-Continent, responding to sustained pressure from the buying side of the market. Refinery-gasoline quotations are up ⅛ cent on all grades and to all classes of trade. Even at the higher prices, refiners, forced into the spot market for part of their current contract commitments, report difficulty in locating their immediate requirements.

Refiners with gasoline inventories in excess of their immediate individual needs are becoming reluctant to accommodate resellers. Evidence is reasonably positive that the gasoline market will seek a higher level in the early part of the vacation season when automobile operation reaches its peak.

### All Grades Affected

Demand from middle western buyers is gaining strength with each passing week. Pressure is evenly spread under the entire range of gasoline specifications although the bulge is perhaps momentarily most acute beneath motor fuels with inferior octane rating. Tractor operators are turning sharply to third-structure gasoline in preference to regular distillate fuels and kerosene. Economies in various phases of tractor operation obtainable by the use of more volatile fuels offset the higher initial cost.

Oklahoma (Group 3) refiners advanced the tank-car price of lubricating oils 1 cent on bright stocks and 0.5 cent per gallon on neutrals late last week, marking the first shift in this particular market since August 1940. The Mid-Continent lubricating-oil market has been threatening to move forward in sympathy with higher prices for Pennsylvania grades for several weeks. More spirited buying since the middle of March, caused by expansion of industrial demand and increased consumption by automobile operation, has removed practically all spot-market offerings. Pennsylvania refiners are asking higher prices again this week and the spread has grown to an extent permitting the inland suppliers to advance quotations.

Oklahoma and Kansas natural-gasoline-plant operators have lifted their quotations for 26-70 material to 2¾ cents per gallon, up ⅛ cent from the previous week's market. Suppliers are barely keeping pace with demand from refiners and jobbers. There is general anticipation that the natural-gasoline market will be able to ride through the summer months of reduced consumption on a price bracket higher than prevailed a year ago.

### Refined Oil Market Barometer

Improvement in the gasoline, lubricating-oil and fuel markets was sustained and extended this week in most major supplying centers and terminal distribution points. Group 3 refiners advanced gasoline ⅛ cent and Gulf Coast suppliers elevated quotations ¼ cent per gallon. Lubricating oils are higher in the Mid-Continent and Pennsylvania.

**MID-CONTINENT:** Shipments are sustained at record-high levels.

**GULF COAST:** Distillate fuels improving slightly.

**CALIFORNIA:** Residual-fuel market strong. Gasoline soft.

**PENNSYLVANIA:** Lubricating-oil advances well supported.

**CHICAGO:** Jobber volume sustained at record-high levels.

The crude-price actions of Humble Oil & Refining Co. in Texas and Sohio Corp. in Illinois were too fresh for an accurate appraisal of their ultimate influence on the market for products. First reaction among refiners, however, was that higher crude prices must be justified by greater plant revenue, if they are to be sustained and extended. Last week's refinery-gasoline price advances of ⅛ cent in the Mid-Continent district were quoted by tank-car suppliers before the crude advance was announced. Refiners drawing their crude supplies from Texas areas in which the raw-material price advance was most substantial admit that higher product markets are now practically necessary, if the expanded volume of consumption this spring and summer is to register as net improvement.

### Resale Market Tight

Quotations of refiners supplying the resale market have almost caught up with prices asked on the open tank-car market. Refiners with contract commitments extended materially beyond their individual producing ability may soon meet difficulty in covering their requirements. At the start of the year some refiners dependent exclusively on the spot market were supplying resellers at prices fully 1 cent below the tank-car quotations. This spread has gradually narrowed until now there is not more than ¼ cent separating the quotations of the refiners who do not maintain expensive selling organizations and those with terminals and extensive personnel to support.

Distillate fuel oils are maintaining their market position without particular difficulty, although some suppliers have dropped their prices ⅛ cent. This reduction has softened the top side of the distillate fuel-oil price structure but the volume of material affected is comparatively slight.

# Gasoline and Distillate-Fuel Prices Up on Eastern Coast

By J. P. O'DONNELL

NEW YORK, Apr. 1.—The normally dull between-seasons period in the East Coast market area was enlivened last week with early improvement in gasoline and belated strengthening in heating oil. Heavy demand for both products was the principal factor in the improvement though increased coastwise tanker rates was an important contributing factor. Gasoline, kerosene, diesel oil and heating-oil prices were advanced and additional price increases were regarded as imminent for both lubricating oils and waxes.

Unbranded gasoline of 72-octane and higher was being quoted generally at 6 cents by major suppliers at the close of the week, up another quarter of a cent. Unbranded motor fuel in the New York Harbor area was maintained at 5.5 cents through the entire winter season and early in March was advanced a quarter of a cent to 5.75 cents. Despite these increases, prices are still running behind those of a year ago. Motor gasoline in the 72-74-octane range last year was bringing 6.25 to 7.5 cents per gallon in mid-March.

Branded regular-grade gasoline was also reported to be quoted higher. Several of the major companies were posting branded motor fuel at 7.4 cents per gallon, an increase of 0.3 cent from the previous week. These advances affected other seaboard points as well as the New York area.

Unbranded gasoline tank-car quotations now range from 5.75 to 6 cents at Boston to 6.75 cents at Norfolk and Charleston. The ruling Baltimore quotation is 6 cents and at Philadelphia 6.95 cents per gallon. Advances in branded gasoline affected principally northeastern terminals with New York-to-Boston prices being advanced 0.3 cent, while those at Philadelphia and Baltimore were reported unchanged at 7 and 6.75 cents respectively.

Socony-Vacuum Oil Co., Inc., raised terminal tank-car prices throughout its New England and New York marketing area and planned to adjust tank-wagon prices in relation to local conditions. In an announcement issued early last week the company stated "tank-car prices for Mobilgas posted at its terminals throughout New York and New England will be increased 0.3 to 0.5 cents a gallon except for the area comprising western New York State. Dealer tank-wagon prices are to be adjusted in accordance with local conditions." This advance was effective March 26.

All major suppliers of No. 2 heating oil raised their New York Harbor tank-car and barge quotations 0.2 cent last week, principally in reflection of the increased coastwise tanker rates. Demand for heating oil in the East Coast area has slumped off considerably with the return of more-moderate temperature, but refiners are reported to be charging more gas oil to cracking units with the result that stocks have continued their abrupt decline. During the third week of March gas oil and distillate inventories on the East Coast dropped 850,000 bbl. No. 2 heating oil is now quoted at 4.2 cents in tank cars and 4.1 cents in barge lots. Corresponding increases were made in New Jersey, New England and New York areas.

Kerosene was also advanced 0.2 cent, making the New York Harbor posting 4.8 cents per gallon. Increased tanker rates accounted in a large measure for the kerosene advance also though suppliers report that demand, seasonally, is extremely satisfactory. The kerosene advance was likewise effective throughout most of the marketing district surrounding the metropolitan area. Late in the week prices at other points were reported unchanged at from 4.75 cents in Philadelphia and Baltimore to 5 cents in Portland.

Diesel oil was also affected by the general improvement and prices were raised 10 cents a barrel to $1.75. Diesel quotations like those of other fuel oils were on the downward trend until the recent upswing in tanker rates and had dropped to $1.65 in the New York Harbor from a season's high of $1.95 per barrel. The diesel-oil advance was limited to North Atlantic points while South Atlantic terminal quotations remained unchanged.

Tanker rates, the principal factor behind the overall improvement in East Coast prices, continued their late season gains last week. Clean rates moved up 3 cents a barrel in midweek with the chartering of the 4,500-ton American tanker W. W. Mills at 60 cents a barrel for No. 2 heating oil for loading about April 14. Corresponding increases in other rates would make that for gasoline now 53 cents a barrel and kerosene 56 cents. Only a few weeks ago a clean tanker had been reported chartered for as low as 37 cents a barrel for heating oil though the nominal rate at that time was reported at approximately 40 cents. Thus in that short period rates have regained half of the loss from the 80-cent high reached in early December and maintained for several weeks.

Current tanker-rate increases still leave rates somewhat below those of a year ago. In late March, 1940, clean boats were being chartered at 70 cents for heating oil, the equivalent of a quarter cent per gallon. An advance that would lift rates to 1940 levels will undoubtedly be followed by another increase in East Coast product prices that will bring them more in line with last year's comparable quotations.

Dirty-tanker rates are also strong and charters for crude-oil shipment are reported available at 50-57 cents per barrel, dependent on the gravity. This is an increase of 2 cents per barrel from rates in effect at the close of the previous week.

*(Continued on Page 127)*

## Gulf Refiners Lift Prices To Offset Crude Advance

HOUSTON, Tex., Apr. 1.—Supported by advances in crude prices, the Gulf Coast refinery market presented a strong front at the opening of the week. Quotations, not only on gasolines, but also for kerosenes, light fuels, and bunker C residuals were moved upward a notch as sellers moved to justify the higher crude prices. Prospects of spread of crude advances removed all hopes of buyers to cover needs at prices existing a week ago.

At least one spot cargo of 80-octane (research) gasoline was sold during the week at 5¼ cents. None was available below that figure. A part cargo of 72-octane (unleaded) gasoline was lifted at a net refinery price of 5⅛ cents. Leaded 72-74-octane gasoline was available at 4⅞ cents although the prevailing quotation was from 5 to 5¼ cents, at which price 70-72-octane (unleaded) gasoline also was being quoted. Gasolines of 68-70-octane were advanced to 4⅞ cents to 5⅛ cents, while other material was quoted at a low of 4¾ cents.

Kerosene tightened in the face of slow demand with material available from limited sources. These sources were asking 3⅝ cents. Buyers thought they still could get material a fraction under that but in the absence of buying this was not established.

Light fuels meeting No. 2 specifications were not available under 3⅛ cents with 43-47 diesel-index oils quoted at 3⅛ to 3¼ cents.

Bunker C in cargoes was firm at 80 cents a barrel, a boost of a nickel.

## *A.P.I. Weekly Refinery Statistics*

**Week Ended March 29, 1941**

| | Capacity reporting (per cent) | Total gasoline stocks (bbl.) | Residual fuel-oil stocks (bbl.) | Gas oil and distillate stocks (bbl.) | Daily crude runs (bbl.) |
|---|---|---|---|---|---|
| East Coast | 100.0 | 20,495,000 | 8,665,000 | 8,206,000 | 595,000 |
| Appalachian | 91.0 | 3,231,000 | 462,000 | 392,000 | 134,000 |
| Ind., Ill., and Ky. | 90.2 | 19,818,000 | 2,940,000 | 2,398,000 | 586,000 |
| Okla., Kans., and Mo. | 76.9 | 8,941,000 | 1,904,000 | 1,239,000 | 282,000 |
| Inland Texas | 59.6 | 2,282,000 | 1,432,000 | 322,000 | 103,000 |
| Texas Gulf | 89.2 | 15,526,000 | 7,010,000 | 5,282,000 | 848,000 |
| Louisiana Gulf | 97.6 | 3,429,000 | 2,314,000 | 1,034,000 | 122,000 |
| N. Louisiana and Ark. | 51.5 | 580,000 | 545,000 | 313,000 | 50,000 |
| Rocky Mountains | 56.0 | 1,740,000 | 480,000 | 169,000 | 58,000 |
| California | 87.3 | 16,635,000 | 68,740,000 | 10,084,000 | 512,000 |
| Total reported | 86.2 | 92,677,000 | 94,492,000 | 29,439,000 | 3,290,000 |
| Est. unreported | ..... | 7,050,000 | 1,660,000 | 510,000 | 335,000 |
| *Est. total | ..... | †99,727,000 | 96,152,000 | 29,949,000 | 3,625,000 |
| *Est. total previous wk. | ..... | 99,541,000 | 95,589,000 | 30,595,000 | 3,655,000 |
| *Mar. 30, 1940 | ..... | 103,425,000 | 102,859,000 | 23,186,000 | 3,585,000 |

*Bureau of Mines. †Includes 6,462,000 bbl. aviation gasoline.

## Stocks of Crude Oil in the United States

(BUREAU OF MINES ESTIMATE)

| | |
|---|---|
| Week ended March 22, 1941 | 263,857,000 barrels |
| Week ended March 15, 1941 | 264,304,000 barrels |
| Week ended March 23, 1940 | 247,401,000 barrels |

Figures do not include stocks of heavy, unrefinable California crude.

# RETAIL OIL MARKETS...

Tank-wagon and filling-station prices on gasoline and kerosene furnished by larger marketing firms

Prices as of April 1, 1941

### Taxes

**The gasoline quotations given in the following tables include the 1½-cent federal tax, as well as state, county, and city taxes. The gasoline is the regular or standard grade. In most areas lower grades and a premium grade also are available.**

### Standard Oil Co. (Indiana)

| | Gasoline Tank wag. | Dlr. | Incl. tax | Kero. tank wag. |
|---|---|---|---|---|
| Chicago, Ill. | 14.6 | 12.6 | 4.5 | 10.0 |
| Decatur | 14.6 | 13.1 | 4.5 | 8.5 |
| Joliet | 15.6 | 14.1 | 4.5 | 10.0 |
| Peoria | 15.6 | 13.2 | 4.5 | 10.0 |
| Quincy | 15.4 | 13.9 | 4.5 | 9.8 |
| Davenport, Ia. | 15.6 | 14.1 | 4.5 | ‡10.0 |
| Des Moines | 15.4 | 13.9 | 4.5 | ‡9.8 |
| Mason City | 15.8 | 14.3 | 4.5 | ‡10.2 |
| Duluth, Minn. | 16.4 | 14.9 | 4.5 | 10.8 |
| Mankato | 16.0 | 14.5 | 4.5 | 9.5 |
| Minneapolis | 16.0 | 14.2 | 4.5 | 10.4 |
| LaCrosse, Wis. | 17.0 | 15.5 | 5.5 | 10.4 |
| Green Bay | 17.4 | 15.9 | 5.5 | 10.8 |
| Milwaukee | 16.8 | 15.3 | 5.5 | 10.2 |
| Detroit, Mich. | 14.1 | 12.6 | 4.5 | 8.1 |
| Grand Rapids | 14.3 | 12.8 | 4.5 | 9.1 |
| Saginaw | 14.9 | 13.4 | 4.5 | 9.1 |
| Evansville, Ind. | 16.6 | 14.4 | 5.5 | †9.8 |
| Indianapolis | 16.8 | 14.8 | 5.5 | †10.0 |
| South Bend | 16.8 | 15.3 | 5.5 | †10.0 |
| Fargo, N. D. | 18.2 | 16.7 | 5.5 | 11.6 |
| Huron, S. D. | 17.5 | 16.0 | 5.5 | 10.9 |
| Kans. City, Mo.* | 14.9 | 11.9 | 4.5 | 8.6 |
| St. Louis* | 14.7 | 13.2 | 4.5 | 9.6 |
| St. Joseph | 14.9 | 13.0 | 4.5 | 8.4 |
| Wichita, Kans. | 13.8 | 12.3 | 4.5 | 7.2 |

*State tax 2 cents, 1-cent city tax, and 1½-cent federal tax. †Does not include 4-cent state tax. ‡Does not include 3-cent state tax.

Exclusive of state general sales taxes.

Discounts to commercial consumers. On purchases per month off tank-wagon prices: 1,000 gal. or more, 1.5 cents off, minimum delivery 25 gal.

### Stanolex Fuel Oil in Chicago

Effective Mar. 26, 1941, f.o.b. Chicago, tank-wagon prices: Standard heater oil, 1-99 gal., 8.75 cents; 100-149 gal., 7.75 cents; 150 gal. and over, 7.25 cents. Stanolex fuel oil No. 1, 1-99 gal., 8.25 cents; 100-399 gal., 7.25 cents; 400 gal. and over, 6.75 cents. Stanolex furnace oil, 1-99 gal., 8.25 cents; 100-399 gal., 7.25 cents; 400 gal. and over, 6.75 cents. Stanolex fuel oil A, 1-399 gal., 6.0 cents; 400-790 gal., 5.0 cents; 800 gal. and over, 4.75 cents. Stanolex fuel oil B, 1-399 gal., 6.0 cents; 400-799 gal., 5.0 cents; 800 gal. and over, 4.75 cents. Stanolex Bunker C fuel oil, 1-999 gal., 4.75 cents; 1,000 gal. and over, 3.75 cents.

### Ohio

STANDARD OIL CO. OF OHIO

| | Gasoline Cons'r tank wag. | Dlr. vided | Incl. tax | Kero. tank wag. |
|---|---|---|---|---|
| Ohio points | 16.0 | 15.0 | 5.5 | *9.0 |

*Includes state tax of 1 cent.

### Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

| | Gasoline Cons'r tank car | Dlr. tank wag. | Incl. tax | Kero. tank wag. |
|---|---|---|---|---|
| Atlantic City | 11.30 | 12.60 | 4.5 | 7.4 |
| Newark | 11.30 | 12.60 | 4.5 | 7.4 |
| Annapolis, Md. | 12.85 | 14.35 | 5.5 | 9.5 |
| Baltimore | 12.25 | 13.75 | 5.5 | 8.0 |
| Cumberland | 13.65 | 15.15 | 5.5 | 10.0 |
| Washington, D.C. | 10.50 | 12.00 | 3.5 | 9.0 |
| Danville, Va. | 14.45 | 16.95 | 6.5 | 9.0 |
| Norfolk | 13.25 | 15.75 | 6.5 | 9.5 |
| Petersburg | 13.55 | 16.05 | 6.5 | 10.5 |
| Richmond | 13.55 | 16.05 | 6.5 | 10.5 |
| Roanoke | 14.75 | 17.25 | 6.5 | 10.0 |
| Charles'n, W. Va. | 14.05 | 16.55 | 6.5 | 11.5 |
| Parkersburg | 13.35 | 15.85 | 6.5 | 11.2 |
| Wheeling | 14.35 | 15.40 | 6.5 | 11.8 |
| Charlotte, N. C. | 16.40 | 16.50 | 7.5 | 9.8 |
| Hickory | 16.95 | 18.45 | 7.5 | 9.7 |
| Mt. Airy | 16.80 | 16.00 | 7.5 | 10.4 |
| Raleigh | 16.15 | 17.00 | 7.5 | 9.7 |
| Salisbury | 16.45 | 15.50 | 7.5 | 10.1 |
| Charleston, S. C. | 14.25 | 16.75 | 7.5 | 9.25 |
| Columbia | 15.10 | 17.60 | 7.5 | (*) |
| Spartanburg | 15.80 | 18.30 | 7.5 | (*) |

**Price basis to Essolene undivided dealers: Dealer tank-wagon price less 0.5 cent per gallon. Price basis to commercial consumers, effective March 8, 1937, in Maryland, District of Columbia, and in Arlington and Fairfax counties in Virginia and March 12 in New Jersey: To contract accounts purchasing at least one full compartment at a time by hose connection, on yearly purchases: From 2,500 to 100,000 gal., consumer tank-wagon price at time and place of delivery: 100,000 gal. per year, consumer tank-car price plus 0.5 cent per gallon. Consumer tank-wagon price generally will be equivalent to dealer tank-wagon price less 0.5 cent per gallon.**

Effective January 16, 1939, in North Carolina the commercial consumer schedule became as follows: Single deliveries of 50 gal. or more, consumer tank-wagon price. Single deliveries of less than 50 gal., 4 cents per gallon over consumer tank-wagon price. Generally the posted consumer tank-wagon price will be equivalent to the dealer price, less 0.5 cent per gallon. The above policy also applies in South Carolina, effective January 23, 1939.

*Kerosene business of the company at these points now exclusively handled by dealers.

### Southern District

STANDARD OIL CO. (KENTUCKY)

| | Gasoline Cons'r tank wag. | Net dlr. | Incl. tax | Kero. tank wag. |
|---|---|---|---|---|
| Atlanta, Ga. | 16.5 | 16.5 | 7.5 | 10.0 |
| Augusta | 16.5 | 16.5 | 7.5 | 9.5 |
| Macon | 16.5 | 16.5 | 7.5 | 9.0 |
| Savannah | 15.5 | 15.5 | 7.5 | 9.0 |
| Birmingham, Ala. | 16.5 | 16.5 | 8.5 | 8.0 |
| Mobile | 17.0 | 17.0 | 9.5 | 8.0 |
| Montgomery | 18.0 | 18.0 | 9.5 | 10.0 |
| Jackson, Miss | 13.0 | 13.0 | 7.5 | 9.0 |
| Vicksburg | 15.5 | 15.5 | 7.5 | 8.5 |
| Jacksonville, Fla. | 16.5 | 16.5 | 8.5 | 8.0 |
| Miami | 16.5 | 16.5 | 8.5 | 8.0 |
| Pensacola | 17.0 | 17.0 | 9.5 | 8.0 |
| Tampa | 16.5 | 16.5 | 8.5 | 8.0 |
| Lexington, Ky. | 15.5 | 15.5 | 6.5 | 9.0 |
| Covington | 13.5 | 13.5 | 6.5 | 9.0 |
| Louisville | 15.0 | 15.0 | 6.5 | 8.5 |
| Paducah | 14.5 | 14.5 | 6.5 | 8.5 |

Price basis to tank-wagon consumers, effective January 4, 1937, 3 cents per gallon below tank-wagon price.

Montgomery, Ala., has a county tax of 1 cent per gallon, and a city tax of 1 cent per gallon on gasoline, in addition to state tax, and 1 cent per gallon on kerosene. Mobile, Ala., has a city gasoline tax of 2 cents per gallon: Birmingham, Ala., has a city gasoline tax of 1 cent per gallon; Pensacola, Fla., has a city gasoline tax of 1 cent. All are included in the table.

### Pennsylvania and Delaware

ATLANTIC REFINING CO.

| | Gasoline Cons'r tank car | Dlr. tank wag. | Incl. tax | Kero. tank wag. |
|---|---|---|---|---|
| Philadelphia, Pa. | 12.5 | 13.5 | 5.5 | 9.5 |
| Pittsburgh | 13.0 | 15.0 | 5.5 | 10.5 |
| Allentown | 13.0 | 14.5 | 5.5 | 10.5 |
| Erie | 12.5 | 15.0 | 5.5 | 10.0 |
| Scranton | 13.0 | 14.5 | 5.5 | 10.5 |
| Altoona | 13.0 | 15.0 | 5.5 | 10.5 |
| Dover, Del. | ... | 14.0 | 5.5 | 10.5 |
| Wilmington | ... | 13.5 | 5.5 | 10.0 |

Price basis to undivided dealers. dealer tank-wagon price less 0.5 cent per gallon.

Discount on kerosene, 2 cents per gallon off tank-wagon price on tank-wagon deliveries of 25 gal. or more at one time.

### Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA

| | Gasoline Tank truck | Serv. sta. | Incl. tax | Kero. tank wag. |
|---|---|---|---|---|
| San Francisco | 16.5 | 17.5 | 4.5 | 11.5 |
| Los Angeles | 16.0 | 17.0 | 4.5 | 10.0 |
| Fresno, Calif. | 17.5 | 18.5 | 4.5 | 12.5 |
| Phoenix, Ariz. | 20.5 | 21.5 | 6.5 | *17.5 |
| Reno, Nev. | 19.5 | 20.5 | 5.5 | 13.5 |
| Portland, Ore. | 19.0 | 20.0 | 6.5 | 13.5 |
| Seattle, Wash. | 19.0 | 20.0 | 6.5 | 13.5 |
| Spokane | 20.5 | 21.5 | 6.5 | 16.5 |
| Tacoma | 19.0 | 20.0 | 6.5 | 13.5 |

*Includes 5-cent state tax.

Discount to dealers: On gasoline, off tank-wagon price, to 100 per cent dealers, 3 cents. To commercial consumers: On tank-wagon price; on single deliveries of 40 gal. and over, advance quantity discount extended at time of delivery, 3 cents. Service-station schedule applies on single deliveries less than 40 gal. On kerosene in tank-car, transport-truck, and trailer delivery, 3 cents off tank-wagon price; plant deliveries to jobbers, 2.5 cents below tank wagon.

March 18, 1939, split dealer discount was canceled.

### New York and New England

SOCONY-VACUUM OIL CO., INC.

| | Gasoline Cons'r tank car | Dlr.* tank wag. | Incl. tax | Kero. tank wag. |
|---|---|---|---|---|
| Albany | 13.1 | 13.8 | 5.5 | 7.3 |
| Met. New York | 12.8 | 13.0 | 5.5 | 7.3 |
| Buffalo | 13.5 | 13.7 | 5.5 | 8.0 |
| Rochester | 13.8 | 14.0 | 5.5 | 8.6 |
| Syracuse | 13.0 | 13.2 | 5.5 | 8.5 |
| Portland, Me. | 12.7 | 13.7 | 5.5 | 7.5 |
| Manchester, N. H. | 13.8 | 13.0 | 5.5 | 8.5 |
| Burlington, Vt. | 14.1 | 14.3 | 5.5 | 7.9 |
| Boston, Mass. | 11.6 | 11.8 | 4.5 | 7.6 |
| Worcester | 12.3 | 12.5 | 4.5 | 7.5 |
| Hartford, Conn. | 12.8 | 13.0 | 4.5 | 6.8 |
| New Haven | 12.2 | 12.4 | 4.5 | 6.8 |
| Providence, R. I. | 11.6 | 12.4 | 4.5 | 7.4 |

*Undivided.

Effective August 8, 1940, the company changed its commercial consumer policy in New York and New England to the following:

Full compartment deliveries: Accounts buying less than 20,000 gal. annually, 0.5 cent above the commercial-consumer price; accounts buying from 20,000 to 120,000 gal. annually, commercial-consumer price; accounts buying 120,000 gal. annually and above, 0.25 cent off consumer price. Split compartment deliveries: Delivery of less than a full compartment, 250 gal., commercial-consumer price plus 1 cent. Steel-barrel deliveries: Commercial price plus 3 cents.

### Rocky Mountain District

CONTINENTAL OIL CO.

| | Gasoline Tank wag. | Incl. tax | Kero. tank wag. |
|---|---|---|---|
| Denver, Colo. | 14.5 | 5.5 | 10.5 |
| Grand Junction | 16.5 | 5.5 | 12.0 |
| Pueblo | 15.5 | 5.5 | 9.0 |
| Casper, Wyo. | 16.5 | 5.5 | 11.5 |
| Cheyenne | 13.0 | 5.5 | 11.0 |
| Billings, Mont. | 16.5 | 6.5 | 12.0 |
| Butte | 15.5 | 6.5 | 13.0 |
| Great Falls | 15.5 | 6.5 | 12.0 |
| Helena | 15.5 | 6.5 | 12.5 |
| Salt Lake, Utah | 16.0 | 5.5 | 14.0 |
| Boise, Idaho | †18.6 | 6.5 | 16.0 |
| Twin Falls | †19.6 | 6.5 | 16.5 |
| Albuquerque, N. M. | *16.0 | 7.0 | 9.5 |
| Roswell | *14.0 | 7.0 | 8.0 |
| Santa Fe | ‡17.0 | 7.5 | 9.5 |

*Includes city tax of 0.5 cent. †Includes toll-bridge tax of 1 mill. ‡Includes city tax of 1 cent.

Tank wagon represents price to consumers. Dealer represents price to dealers. If no dealer price is quoted, the tank-wagon price applies to all classes of trade.

### Central South District

STANDARD OIL CO. OF LOUISIANA

| | Gasoline Cons'r tank car | Dlr. tank wag. | Incl. tax | Kero. tank wag. |
|---|---|---|---|---|
| New Orleans, La. | 14.25 | 16.75 | 8.5 | ‡10.0 |
| Baton Rouge | 14.75 | 17.25 | 8.5 | ‡10.5 |
| Alexandria | 14.75 | 17.25 | 8.5 | ‡10.5 |
| Lafayette | 15.00 | 17.50 | 8.5 | ‡10.0 |
| Lake Charles | 14.75 | 17.25 | 8.5 | ‡10.0 |
| Shreveport | 14.00 | 16.50 | 8.5 | 10.0 |
| Knoxville, Tenn. | 18.00 | 20.00 | 8.5 | 12.5 |
| Memphis | 15.00 | 17.00 | 8.5 | 10.5 |
| Chattanooga | 17.50 | 17.35 | 8.5 | 12.0 |
| Nashville | 17.00 | 17.50 | 8.5 | 10.0 |
| Bristol | 18.25 | 18.25 | 8.5 | 12.0 |

Essolene at dealer price less 0.5 cent per gallon to undivided dealers.

‡Includes 1-cent state tax.

Price basis to commercial consumers: Effective May 15, 1937, deliveries of 50 gal. or more in one territory take posted consumer tank-wagon price. Accounts taking deliveries of less than 50 gal. at one time pay posted consumer tank-wagon price plus 4 cents per gallon. Generally, the posted consumer tank-wagon price will be equivalent to the dealer price less 0.5 cent per gallon. Kerosene prices include 1-cent state tax.

Effective February 24, 1939, the company reestablished in New Orleans the commercial consumer policy on motor fuel effective in the rest of the state.

Effective December 12, 1938, the company revised its commercial consumer policy on motor fuel in New Orleans, as follows: Single deliveries of less than 50 gal., consumer tank car plus 2 cents per gallon 50 to 199 gal., consumer tank car plus 1 cent per gallon; 200 gal. and over, consumer tank car plus 0.5 cent per gallon.

### Oklahoma and Arkansas

CONTINENTAL OIL CO.

| | Gasoline Tank wag. | Incl. tax | Kero. tank wag. |
|---|---|---|---|
| Texarkana, Ark. | 13.5 | 5.5 | 6.0 |
| Fort Smith | 13.5 | 5.5 | 6.5 |
| Little Rock | 16.0 | 8.0 | 8.0 |
| Muskogee, Okla. | 13.5 | 5.5 | 7.0 |
| Oklahoma City | 11.5 | 5.5 | 6.5 |
| Tulsa | 11.5 | 5.5 | 6.0 |

Tank wagon represents price to consumers. If no dealer price is quoted, the tank-wagon price applies to all classes of trade.

### Nebraska

STANDARD OIL CO. OF NEBRASKA

| | Gasoline Tank wag. | Dlr. | Incl. tax | Kero. tank wag. |
|---|---|---|---|---|
| Omaha | 17.4 | 15.9 | 6.5 | 9.8 |
| McCook | 17.0 | 14.4 | 6.5 | 9.5 |
| Norfolk | 17.5 | 15.9 | 6.5 | 9.9 |
| North Platte | 17.8 | 16.0 | 6.5 | 10.2 |
| Scottsbluff | 17.4 | 15.0 | 6.5 | 10.8 |

Discounts to commercial consumers for tank-wagon deliveries covered only by standard commercial consumers contract, effective January 1, 1935.

### Texas

| | Gasoline Tank wag. | Serv. sta. | Incl. tax | Kero. tank wag. |
|---|---|---|---|---|
| Dallas, Tex. | 11.5 | 15.5 | 5.5 | 6.0 |
| Fort Worth | 11.5 | 15.5 | 5.5 | 7.0 |
| Houston | 12.0 | 16.0 | 5.5 | 8.0 |
| San Antonio | 12.5 | 17.0 | 5.5 | 8.0 |

### Naphtha

STANDARD OIL CO. (INDIANA)

| | Tank wagon* |
|---|---|
| Oleum spirits | 16.2 |
| V.M.&P. naphtha | 16.5 |
| Cleaners' naphtha | 15.5 |
| Stanisol | 15.5 |

*Prices include 3-cent Illinois tax but not 1-cent federal tax nor 2 per cent retail occupational tax.

Prices f.o.b. Chicago. Each price subject to discount of 1 cent per gallon for 150-gal. lots if covered by contract.

### Canada*

3-Star Imperial Gasoline
IMPERIAL OIL, LTD.

| | Gasoline Tank wag. | Incl. tax | Kero. tank wag. |
|---|---|---|---|
| Halifax, N. S. | 24.5 | 10.0 | 18.0 |
| St. John, N. B. | 24.5 | 10.0 | 18.0 |
| Montreal, Que. | 24.0 | 8.0 | 16.5 |
| Toronto, Ont. | 24.5 | 8.0 | 17.0 |
| Hamilton, Ont. | 24.5 | 8.0 | 17.0 |
| Winnipeg, Man. | 27.5 | 7.0 | 22.5 |
| Brandon, Man. | 28.0 | 7.0 | 22.5 |
| Regina, Sask. | 25.0 | 7.0 | 20.0 |
| Saskatoon, Sask. | 20.8 | 7.0 | 22.8 |
| Edmonton, Alta. | 25.9 | 7.0 | 20.0 |
| Calgary, Alta. | 23.0 | 7.0 | 18.0 |
| Vancouver, B. C. | 21.0 | 7.0 | 23.0 |

*Imperial gallon used in Canada.

Divided dealers pay tank-wagon prices. Discount to undivided dealers, 1 cent below tank-wagon price. In Maritime Provinces both divided and undivided dealers pay tank-wagon price.

## Tank-Wagon Changes

Standard Oil Co. (Indiana) reduced the tank-wagon price of heating oil 0.25 cent per gallon to some classes of trade in Chicago, March 26.

Standard Oil Co. of New Jersey advanced the kerosene tank-wagon price 0.2 cent per gallon throughout New Jersey, effective March 27.

Standard Oil Co. of Kentucky made general advances in the regular gasoline tank-wagon price in Georgia and Florida on March 24. Increases ranged from 0.5 to 1.5 cents per gallon. The company advanced the tank-wagon price at Paducah, Ky., 2 cents per gallon March 20. The kerosene tank-wagon price at Atlanta, Ga., was advanced 1 cent March 17.

Socony-Vacuum Oil Co., Inc., advanced the consumer tank-car and deal-

*(Continued on Page 127)*

# PRICES OF REFINED PRODUCTS...

All quotations f.o.b. plant in cars for interstate or export movement except as otherwise noted

Prices as of April 1, 1941
(Most prices in cents per gallon)

The quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents a gallon on lubricating oils. Octane ratings in Middle West, Mid-Continent, and Southwest are based on A.S.T.M. method of testing.

## Refinery Gasoline

**OKLAHOMA (Group 3)—**

| | | |
|---|---|---|
| U. S. Motor grades: | | |
| 72-74 octane (regular) | .04⅝ | .04¾ |
| 63-66 octane | .04¼ | .04⅝ |
| 60 octane and below | .03⅞ | .04 |
| 60-62 400 grades: | | |
| 72-74 octane (regular) | .04⅝ | .04¾ |
| 63-66 octane | .04¼ | .04⅝ |
| 60 octane and below | .03⅞ | .04 |

**NORTH TEXAS—**

| | | |
|---|---|---|
| U. S. Motor grades: | | |
| 72-74 octane (regular) | .04½ | .04⅝ |
| 63-66 octane | .04⅛ | .04¼ |
| 60 octane and below | .03¾ | .03⅞ |
| 60-62 400 | .03¾ | .04⅛ |

**NORTH LOUISIANA (Ark. and N. La. delivery)—**

| | | |
|---|---|---|
| U. S. Motor grades: | | |
| 72-74 octane (regular) | .04½ | .04⅝ |
| 63-66 octane | .04⅛ | .04¼ |
| 60 octane and below | .03¾ | .03⅞ |

**ARKANSAS (Ark. and N. La. del.)—**

| | | |
|---|---|---|
| U. S. Motor grades: | | |
| 72-74 octane (regular) | .04½ | .04⅝ |
| 60 octane and below | .03¾ | .03⅞ |

**CHICAGO (Based on Group 3)—**

| | | |
|---|---|---|
| U. S. Motor grades: | | |
| 72-74 octane (regular) | .04⅝ | .04¾ |
| 63-66 octane | .04¼ | .04⅝ |
| 60 octane and below | .03⅞ | .04 |
| 60-62 400 grades: | | |
| 72-74 octane (regular) | .04⅝ | .04¾ |
| 63-66 octane | .04¼ | .04⅝ |
| 60 octane and below | .03⅞ | .04 |

**PENNSYLVANIA (inland refineries)—**

| | |
|---|---|
| 74-76 octane (regular) | .06 |
| 72-74 octane | .05¾ |

**CALIFORNIA (domestic movement)—**

| | | |
|---|---|---|
| 58-60 400, 65 oct. and higher | .05½ | .07 |
| 54-58 U. S. Motor | .04¾ | .06¼ |

**EAST COAST (domestic)—**

| | | |
|---|---|---|
| U. S. Motor grades: | | |
| New York (Bayonne)* | .05¾ | .06 |
| Philadelphia | .05½ | .06¾ |
| Boston | .05¾ | .06¾ |
| Baltimore | .05½ | .05⅞ |
| Charleston, S. C. | .05¾ | .06 |

*All grades of gasoline ⅛ to ¼ cent less for barge shipments. New York Harbor prices are for New York and New England delivery. Prices for New Jersey delivery ¼ cent lower.

**GULF COAST (domestic)—**

| | | |
|---|---|---|
| U. S. Motor grades: | | |
| 72-74 octane (leaded) | .05 | .05⅛ |
| 70-72 octane (unleaded) | .05 | .05¼ |
| 68-70 octane (unleaded) | .04⅞ | .05⅛ |
| Below 68 octane (unleaded) | | .04¾ |

## Natural Gasoline

**OKLAHOMA (Group 3)—**

| | |
|---|---|
| Grade 26-70 | .02¾ |
| Grade 18-55 | .03¼ |

**NORTH TEXAS—**

| | |
|---|---|
| Grade 26-70 | .02½ |
| Grade 18-55 | .02¾ |

**CALIFORNIA—**

| | | |
|---|---|---|
| 75-85 375-390 | .04½ | .05¼ |

**NORTH LOUISIANA (Ark. and N. La. delivery)—**

| | |
|---|---|
| Grade 26-70 | .02½ |

## Tractor Fuel

**OKLAHOMA (Group 3)—**

| | | |
|---|---|---|
| 40-42 gr., 315-325 i.b.p., 110-flash, 540-550 e.p. | .03½ | .03⅝ |
| 41-43 gr., 300-320 i.b.p., 110-125 flash, 500-520 e.p. | .03¾ | .03¾ |
| 46-48 gr., 210-230 i.b.p., 480-max., e.p. | .03⅞ | .04 |

## Kerosene

(All kerosene water white)

**OKLAHOMA (Group 3)—**

| | | |
|---|---|---|
| 42-44 | .04¼ | .04⅜ |
| 41-43 | .04⅛ | .04¼ |

**NORTH TEXAS—**

| | | |
|---|---|---|
| 41-43 | .04 | .04⅛ |

**NORTH LOUISIANA (Ark. and N. La. delivery)—**

| | | |
|---|---|---|
| 41-43 | .04 | .04⅛ |

**ARKANSAS (Ark. and N. La. del.)—**

| | | |
|---|---|---|
| 41-43 | .04 | .04¼ |

**PENNSYLVANIA (inland refineries)—**

| | | |
|---|---|---|
| 46 | .05¼ | .05½ |
| 45 | .05⅛ | .05¼ |

**CHICAGO (Based on Group 3)—**

| | | |
|---|---|---|
| 42-44 | .04¼ | .04⅜ |
| 41-43 | .04⅛ | .04¼ |

**CALIFORNIA (Pac. Coast market)—**

| | | |
|---|---|---|
| 38-40 high-burning test | .04½ | .05½ |

**NEW YORK (Bayonne, N. J.)—**

| | |
|---|---|
| 41-43 | .048 |

**GULF COAST (domestic)*—**

| | |
|---|---|
| 41-43 | .03⅜ |

*Barge price ⅛ cent lower.

## Furnace Oil

**OKLAHOMA (Group 3)—**

| | | |
|---|---|---|
| Range oil | .03⅞ | .04⅛ |
| No. 1 prime white, 38-42 | .03¾ | .04 |
| No. 1 straw, 38-40 | .03¾ | .04 |
| No. 2 straw, 32-36 | .03⅜ | .03½ |
| No. 3 zero to 10, 28-32 | .03¼ | .03⅜ |

**NORTH TEXAS—**

| | | |
|---|---|---|
| No. 1 prime white, 38-42 | .03¾ | .03⅞ |
| No. 1 straw, 38-40 | .03⅜ | .03¾ |

**NORTH LOUISIANA (Ark. and N. La. delivery)—**

| | | |
|---|---|---|
| No. 2, 32-36 | .03½ | .03⅝ |

**ARKANSAS (Ark. and N. La. del.)—**

| | | |
|---|---|---|
| No. 2, 32-36 | .03½ | .03⅝ |

**CHICAGO (Based on Group 3)—**

| | | |
|---|---|---|
| Range oil | .03⅞ | .04⅛ |
| No. 1 prime white, 38-42 | .03¾ | .04 |
| No. 2 straw, 32-36 | .03⅜ | .03½ |
| No. 3 zero to 15, 28-32 | .03¼ | .03⅜ |

**NEW YORK (Bayonne, N. J.)—**

| | |
|---|---|
| *No. 1 | .048 |
| *No. 2 | .042 |
| *No. 3 | .042 |

*Barge deliveries ⅛ to ¼ cent under above tank-car price.

## Gas Oil and Fuel Oil

(Gas oil per gal., fuel oil per bbl.)

**OKLAHOMA (Group 3)—**

| | | |
|---|---|---|
| U.G.I. gas oil, under 35 | .03⅛ | .03¼ |
| No. 5, low pour point, 18-22 | .75 | .80 |
| No. 6, 15 and above, 8-14 | .60 | .65 |

**NORTH TEXAS—**

| | | |
|---|---|---|
| U.G.I. gas oil, under 35 | .03 | .03⅛ |
| No. 5, low pour point, 18-22 | .75 | .80 |
| No. 6, 15 and above, 8-14 | .60 | .65 |

**NORTH LOUISIANA (Ark. and N. La. delivery)—**

| | |
|---|---|
| 10-14 fuel oil, industrial | .70 |

**CHICAGO (Based on Group 3)—**

| | | |
|---|---|---|
| U.G.I. gas oil | .03⅛ | .03¼ |
| No. 5, low pour point, 18-22 | .75 | .80 |
| No. 5, 15 and above, 18-22 | .60 | .70 |
| No. 6, low pour point, 10-16 | .60 | .70 |
| No. 6, 15 and above, 8-14 | .60 | 65 |

**PENNSYLVANIA (inland refineries)—**

| | | |
|---|---|---|
| 36-40 | .04½ | .05 |

**CALIFORNIA—**

| | | |
|---|---|---|
| Los Angeles: | | |
| 30-40 gas oil, per bbl. | 1.10 | 1.25 |
| 24 plus diesel, per bbl. | 1.10 | 1.25 |
| 24 plus diesel (bunkers) | 1.20 | 1.35 |
| 12-16 (bunkers at tidewater) | .65 | .75 |
| 10-16 (cargo lots) | .65 | .75 |
| 12-17 (tank cars) | .60 | .85 |
| 10-17 (high sulfur) | .45 | .60 |
| San Joaquin Valley: | | |
| 10-18 (tank cars) | .50 | .70 |
| 24 plus diesel, per bbl. | 1.10 | 1.25 |
| San Francisco: | | |
| 24 plus diesel, per bbl. | 1.35 | 1.40 |
| 24 plus diesel (bunkers) | 1.40 | 1.50 |
| 10-16 (bunkers) | .75 | .80 |

**GULF COAST—**

| | | |
|---|---|---|
| No. 2 fuel | .03½ | .03¼ |
| 43-47 diesel | .03⅛ | .03¼ |
| 48-52 diesel | .03⅛ | .03⅜ |
| 53-57 diesel | .03½ | .03⅞ |
| 58-and-above diesel | .03⅝ | .03¾ |
| Diesel bunkers | | 1.40 |
| Bunker C (bulk cargoes) | | .80 |
| Bunker C (bunkers) | | .80 |

**NEW YORK (Bayonne, N. J.)—**

| | | |
|---|---|---|
| 27 plus, gas oil | | .044 |
| 28-30 diesel (lighterage 6¼c per bbl.) | | 1.75 |
| 28-30 diesel (tank cars) | | .045 |
| Bunker C (to ocean-going ships in N. Y. Harbor) | | 1.25 |
| Industrial fuel (tank cars) | .0315 | .035 |

Lighterage charge 5c bbl. additional.

## Bright and Steam Refined

**OKLAHOMA (Group 3)—**

| | | |
|---|---|---|
| 200-210 D, 10-25 | | .19 |
| 150-160 D, 0-10 | | .14½ |
| 150-160 D, 10-25 | | .14 |
| 100-110 D, 0-10 | | .14 |
| 100-110 D, 10-25 | | .13½ |
| Steam refined: | | |
| 600 dark green (untreated) | | .08 |

**PENNSYLVANIA—**

| | | |
|---|---|---|
| Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash): | | |
| 10 pour point | | .17½ |
| 15 pour point | | .16½ |
| 25 pour point | | .15 |
| Steam refined: | | |
| 600 | .09 | .10½ |
| 650 | .09½ | .11½ |
| 600 flash | .10 | .12 |
| 630 flash | .11 | .12 |

## Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

**OKLAHOMA (Group 3)—**

| | | |
|---|---|---|
| 0-10 pour point: | | |
| 150-3 | | .08½ |
| 180-3 | | .09 |
| 200-3 | | .09 |
| 250-3 | | .10½ |
| 280-3 | | .11 |
| 280-4 | | .10½ |
| 300-3½ | | .11½ |
| 350-3½ | | .12 |
| 400-3½ | | .12½ |
| 500-3½ | | .13 |
| 600-3½ | | .13½ |
| 100-2½ paraffin oil 10-25 | | .05¼ |
| 10-25 pour point: | | |
| 200-3 | | .08½ |
| 250-3 | | .10 |
| 280-3 | | .10⅛ |
| 280-4 | | .10 |

**GULF COAST—**

| | | |
|---|---|---|
| Pale oils: | | |
| 100-3 | .05¼ | .05¼ |
| 200-3 | .07¼ | .07¼ |
| 300-3 | .07¼ | .07⅝ |
| 500-3½ | .08¼ | .08½ |
| 750-3½ | .08⅝ | .08¾ |
| 1,200-3½ | .08⅝ | .08⅞ |
| 2,000-4 | | .09 |
| 3,000-4 | | .10½ |
| Red oils: | | |
| 200-5-6 | .06⅞ | .07 |
| 300-5-6 | .07¼ | .07½ |
| 500-5-6 | .08 | .08¼ |
| 750 | .08⅝ | .08½ |
| 1,200-5-6 | .08½ | .08⅝ |

**CALIFORNIA (moving to dom. market)—**

| | | |
|---|---|---|
| Pale oils: | | |
| 100-2½-3 | .07¼ | .08 |
| 200-2½-3 | .07¼ | .08 |
| 300-2½-3 | .07¼ | .08 |
| 400-3-4 | .07¼ | .08 |
| 450-3-4 | .07¼ | .08 |
| 550-3-4 | .09 | .11 |
| 600-3-4 | .09 | .11 |
| Red oils: | | |
| 200-4-5 | .07¼ | .08 |
| 300-5-6 | .07¾ | .08 |
| 350-5-6 | .09¼ | .11½ |
| 400-5-6 | .09¼ | .11½ |
| 450-5-6 | .09¼ | .11½ |
| 500-5-6 | .09¼ | .11½ |
| 600-5-6½ | .09¼ | .11½ |
| 700-6½ plus | .09¼ | .11½ |
| 750-6½ plus | .09¼ | .11½ |
| 900-6½ plus | .09¼ | .11½ |

**PENNSYLVANIA—**

| | | |
|---|---|---|
| 150 vis. at 70° F., 3 color, 400-405 flash: | | |
| Zero pour point | | .25½ |
| 10 pour point | | .24½ |
| 15 pour point | | .23½ |
| 25 pour point | | .21 |
| 200 vis., at 70° F., 3 color: | | |
| Zero pour point | | .27½ |
| 10 pour point | | .26½ |
| 15 pour point | | .25½ |
| 25 pour point | | .23 |

## Wax and Petrolatum

(Prices per pound)

**OKLAHOMA (Group 3)—**

| | | |
|---|---|---|
| 124-126 (A.m.p.) w.c. scale | .02¾ | .03 |

**PENNSYLVANIA (inland refineries)—**

| | | |
|---|---|---|
| 122-124 (A.m.p.) w.c. scale | .02⅞ | .03¼ |
| 124-126 (A.m.p.) w.c. scale | .03 | .03¼ |

**NEW YORK—**

| | | |
|---|---|---|
| Wax in bags fully refined: | | |
| 125-127 (A.m.p.) wax | | .0560 |
| 128-130 (A.m.p. wax | | .0560 |
| 130-132 (A.m.p.) wax | | .0585 |
| 133-135 (A.m.p.) wax | | .0615 |
| 135-137 (A.m.p.) wax | | .0640 |
| Crude scale: | | |
| 124-126 (A.m.p.) w.s. | .02¾ | .03 |
| 124-126 (A.m.p.) y.s. | .02¾ | .03 |
| Petrolatum in barrels, carload lots: | | |
| Dark green | .02500 | .02625 |
| Amber | .02375 | .02875 |
| Extra amber | .02625 | .03250 |
| Lily white | .04375 | .05125 |
| Snow white | .05125 | .06125 |
| Cream | .03375 | .04125 |

## Export Prices

### GASOLINE

**GULF COAST—**

| | | |
|---|---|---|
| 60-62 400 | .04⅛ | .05½ |
| 61-63 390 | .04¼ | .05¼ |
| 64-66 375 | .04⅛ | .05¼ |

**LOS ANGELES—**

| | | |
|---|---|---|
| U. S. Motor grades: | | |
| Above 69 octane | .05½ | .05¾ |
| 65-69 octane | .05¼ | .05½ |
| 60-65 octane | .04½ | .05 |

### KEROSENE

**GULF COAST—**

| | | |
|---|---|---|
| 41-43 water white | .03¾ | .03½ |

**LOS ANGELES—**

| | | |
|---|---|---|
| 41-43 water white | .05 | .05¼ |

### LUBRICANTS

(Pennsylvania Grade)

**NEW YORK (f.a.s. in bbl.)—**

| | |
|---|---|
| Cylinder stocks: | |
| 600 S.R. unfiltered | .18 |
| 630 S.R. unfiltered | .18¼ |
| 600 flash, S.R. | .18½ |
| 650 flash, S.R. | .20 |
| Bright stock: | |
| Light, 25 pour point | .22 |

### NEUTRAL OIL

| | |
|---|---|
| 200-3 color | .30 |
| 150-3 color | .27½ |

### PARAFFIN WAX

**NEW YORK (prices per lb.)—**

| | | |
|---|---|---|
| 123-125 A.m.p. | | .0560 |
| 125-127 A.m.p. | | .0560 |
| 128-130 A.m.p. | | .0585 |
| 133-135 A.m.p. | | .0615 |
| 135-137 A.m.p. | | .0640 |
| Crude scale: | | |
| 124-126 w.s. | .02¾ | .03 |
| 124-126 y.s. | .02¾ | .03 |

# Possible Oil Provinces Cover Wide Area

*(Continued from Page 13)*

sissippi sectors disclose the presence of Paleozoic sediments beneath the Cretaceous. These are known to be oil bearing, particularly in the Hartselle sandstone of Chester age. There is thus a possibility of finding production analogous to that of Illinois beneath the Cretaceous and later covering, added, of course, to the numerous structures and wedge edges in these formations.

In Florida the formations thicken southward and dip outward from the Ocala limestone high in the northwestern part of the peninsula.

Many wells have been drilled throughout the area but these have not, as a rule, been well located. Production has been obtained in the Eocene at Tinsley and Pickens. Chief among the discouraging factors in this region are the great depth of the Paleozoic formations and the fact that the wells already drilled on such pronounced structures as the Hatchitigbee anticline have been failures. Results at Tinsley indicate that most prospects have failed to go deep enough to find the pays which produce in that field.

### Mid-Continent Area

The Tulsa Geological Society presented reports on five main areas. These are North and South Dakota, western Nebraska, the Salina and Forest City basins, the Anadarko basin and Oklahoma Panhandle, and the Ouachita-Arkansas Valley region.

In North and South Dakota, there is an area of 100,000 sq. miles having from 1,000 to 12,000 ft. of sediments. The Cretaceous overlaps most of the area and masks the underlying structures. Little is known about the older formations. Some production has been obtained from the Baker-Glendive anticline in the western part of the area from Mississippian and Devonian limestones, as well as shallow gas. The Mesozoic overlaps on the Paleozoic beds with a great unconformity and there are gaps in the Paleozoic section as well.

The chief structure in western Nebraska is the Cambridge arch which ties the Black Hills uplift to the Central Kansas uplift. Tertiary formations mask practically all of the underlying Cretaceous which is productive in Wyoming to the west. Also, the Sundance and Morrison wedge out beneath the Cretaceous and are separated from the underlying Paleozoic by a great unconformity. Various potential producing horizons, such as the Lansing-Kansas City, Hunton, and Arbuckle, wedge out against the flanks of the arch and the basal sand which lies directly on granite is known to be productive in Kansas to the south. An area of 22,500 sq. miles is underlain by 3,500-4,500 ft. of sediments in this area.

Many wells have been drilled in the Salina and Forest City basins which are separated by the Nemaha granite ridge. The Falls City pool produces in the latter area from the Hunton and many pools along the Central Kansas uplift are within the southern border of the Salina basin. This production may be pushed northward into the basin. There has been much prospecting in the area, but most of the wells were not deep and the strong unconformity at the base of the Mississippi lime obscures deeper structures. The prospective oil area contains 60,000 sq. miles with from 1,000 to 4,500 ft. of sediments.

The Anadarko basin and Oklahoma Panhandle contain 140,000 sq. miles in which the sediments average 10,000 ft. in thickness. The surface formations resemble those of the Texas Panhandle but the thick Pennsylvanian beds beneath have good possibilities. The multiple-pay Cement field is on the border of the area and the pays found there may be repeated elsewhere. Prospecting in this area has met with discouragement because of the supposed great depth of the lower possible pays. However, Oklahoma City and other fields have disclosed the presence of strong uplifts which may elevate the lower beds to unexpectedly high levels.

Surrounding the complexly folded and overthrust Ouachita uplift on the north is a belt of sediments 3,000 to 10,000 ft. thick occupying a possible producing area of 12,500 sq. miles. In the Arkansas River Valley there are a number of gas fields but the area has not been intensively prospected in spite of the production in Muskogee County to the northwest. High carbon ratios combined with a great thickness of nonproductive beds have combined to discourage much activity here.

### West Texas-New Mexico

Three areas surrounding the prolific fields of the Permian basin have been left almost unprospected. These are the north Llano Estacado, the Edwards Plateau and the trans-Pecos region to the west of Pecos County. The limited market for West Texas crude and the great potentialities of the district have kept operators from pushing too far into the unknown areas. To this may be added a thick cover which lies unconformably on the older possible pays.

The Llano Estacado district, lying between the Amarillo Mountains containing the Panhandle oil and gas district, is covered by Triassic rocks which overlie the evaporites of the Permian. The volume of sediments is some 76,000 cu. miles and if the West Texas pays extend into this region they would probably lie well below 5,000 ft.

The Edwards Plateau is covered by the Edwards limestone and other formations of Lower Cretaceous age. The possibilities of the plateau may be estimated to some extent by the fact that Yates, Big Lake and other pools in the southern part of the West Texas region lie along the side of the plateau. The same Permian, Pennsylvanian and Ordovician formations that produce in West Texas and on the Bend arch underlie the Lower Cretaceous or Comanchean rocks. The volume of sediments is approximately 26,000 cu. miles.

The trans-Pecos region lies on the west and south flank of the Fort Stockton high and the lower formations may not exactly resemble those of the Permian basin. It is dissected by faults and great fault blocks form long mountain ridges extending from north to south. The areas between are filled with detrital material which may extend to considerable depths. In the fault blocks is visible a complete section embracing the whole of the Paleozoic and there are many breaks in the section. The volume of sediments to be prospected is about 75,000 cu. miles.

### Rocky Mountain Areas

The high plains in front of the Rockies are broken up by arcuate chains which turn at their northern ends towards the mountains. The southern Rockies have the same general structure. As a result the whole area is divided into a number of basins surrounded by high rims. These include the Powder River basin, Big Horn basin, Green River basin, North and South Parks in Colorado, the Uinta basin of western Colorado and Utah. In northwestern New Mexico and northeastern Arizona this basin country is terminated by an eastward swing of the basin ranges and the Colorado Plateau. The thick section cut by the Grand Canyon does not promise much in the way of production, but farther north where marine beds overlie the red Permian deposits there are many chances for oil production. In Wyoming many of the basins contain important oil fields and there are great thicknesses of bituminous shales in the Green River basin as well as in western Colorado. The largest fields in the area, Salt Creek and Lance Creek, lie on the flank of the Powder River basin. In Northwest New Mexico, Hogback and Rattlesnake yield a high-gravity crude. There would seem to be no valid reason why each of the basins in this region should not be important producers of oil. Prospecting has been delayed largely because of the distance from markets and the fact that production sufficient for these markets was already obtained elsewhere.

The whole Mesozoic section has possibilities for production and beneath this there are the black-oil-bearing Embar and Tensleep formations and the Amsden limestone.

To the east of the Rocky Mountain area is the Greasewood anticline of eastern Colorado which has been prospected to a greater extent than much of the rest of the area. Here the westward-dipping Mesozoic beds are overlain by Tertiary continental deposits and both in turn are separated from the Paleozoic by a great unconformity. Drilling in this area will provide many difficulties but the potentialities are great.

### Great Plains of Canada

Extending from the border down the Mackenzie River Valley to the Arctic is one of the largest undrilled areas in the continent. The Turner Valley field lies on the west side of this area and there are a few small fields such as Wainwright and the newly discovered Steveville field within the district. Almost in the center are the Lower Cretaceous sands of the Athabaska River which are highly impregnated with oil and are estimated to contain from 100 to 200 billion barrels, or from 5 to 10 times the present known reserves of the United States. Farther north on the Mackenzie River is the Fort Norman oil field. Oil is therefore known to occur in the Cretaceous, Mississippian and Devonian. Between the Jurassic and the Paleozoic beds there is a great unconformity and in different parts of the area the underlying formations range from Devonian to Pennsylvanian in age.

### Alaska

Similar in character to the Canadian Great Plains area are large parts of Alaska. There are many oil and gas seeps throughout the territory but drilling in the southern part has been unsuccessful to date. Probably the largest area with potentialities for production lies along the north coast, where an uplift swings to the west from the Mackenzie and Franklin mountains along the Mackenzie River.

### Pacific Coast

Four areas along the Pacific Coast were considered, namely, coastal embayments of Washington and Oregon, the California Coast north of the Santa Barbara area, the Sacramento Valley lying to the north of the San Joaquin Valley and the Imperial Valley to the south. The coastal areas have thick sections of sediments which resemble those of the Ventura and Los Angeles basins. The Hoh series, which outcrops on the Olympic Peninsula west of Puget Sound, has deposits of asphalt so that there are definite possibilities throughout the region.

There are now several large dry-gas fields in the Sacramento Valley but oil is not known in commercial quantities north of the Coalinga districts. There would seem to be no valid reason why the oil that occurs farther south should stop at Coalinga so that production will probably move gradually north into the Sacramento Valley as well.

The Imperial Valley is structurally very similar to the producing areas in California, but a great thickness of late Tertiary and recent continental deposits masks the underlying structures. The principal reason for the absence of prospecting in these four areas is the fact that these districts

which are now producing are capable of supplying the available market.

### Subcommittee Conferences

The afternoon conferences of the research subcommittees were well attended and the interest displayed bore testimony to the importance of the topics discussed. The conference on sedimentation was of particular interest and, in order to cover the program as planned, the session was divided into three parts. The first matter before the conference was a discussion by Dr. W. A. Waldschmidt, Colorado School of Mines, on the results of his work on analysis of cores from the Rocky Mountain region. This part of the program was under the leadership of Wayne Galliher, Barnsdall Oil Co., Los Angeles, Calif., who is leader of the subcommittee on sedimentation. The group then discussed the deposition of Recent sediments under the direction of F. W. Rolshausen, Humble Oil & Refining Co., Houston, Tex. The final session under the direction of W. C. Krumbein, University of Chicago, took up the criteria for determining the presence of unconformities by subsurface methods, well cuttings, electric logs or any other technique. The early determination of the presence of an unconformity is often of great commercial importance and although they are plainly observable on the surface, little has been done towards assembling the evidence of unconformities through subsurface work.

The subcommittee on the origin and evolution of oil, under the leadership of M. G. Cheney, Anzac Oil Corp., Coleman, Tex., discussed the practical application of a knowledge of this fundamental subject to petroleum geology. An interesting phase of the discussion was the criteria for appraising a theory of oil origin. This is particularly important as many theories which are chemically sound omit consideration of geological factors and vice versa. Experts in physical and chemical fields as well as geological participated in the discussion.

The conference on migration and accumulation of oil, under the direction of F. M. van Tuyl and Ben H. Parker, Colorado School of Mines, Golden, Colo., discussed four principal topics. These were (*a*) the minimum age, depth of burial and degree of inclination necessary to permit commercial accumulations of oil; (*b*) the differences, if any, in stratigraphy, structure, composition of the waters and petrography of the reservoirs between productive and nearby barren traps; (*c*) evidence whether or not migration of oil in productive pools is sufficiently rapid to permit reconcentration in commercial quantities of the residual oil remaining in a field after the wells have been abandoned, and (*d*) the significance of tightly cemented zones around the edges of certain oil fields and their effect on postdevelopment migration and ultimate recovery.

The subcommittee on relationship of crude oil and stratigraphy, under the leadership of L. Murray Neumann, Carter Oil Co., Tulsa, discussed the results of the research commenced last year (The Oil and Gas Journal, April 11, 1940, p. 46). A large number of oil analyses have been made and the possibilities of this project aroused great interest on the part of those attending the conference as well as those who studied the subcommittee's exhibits at other times.

The group meeting on oil-field waters, under the direction of L. C. Case, Gulf Oil Corp., Tulsa, considered the significance of water characteristics with regard to the occurrence of oil, the relationship of oil to fresh water, and the applications of water analysis to petroleum geology.

As at the Chicago meeting in 1940, the program of the A.A.P.G. research committee aroused great interest and these conferences have led to a much greater understanding of the fundamentals of the occurrence of petroleum than even the leaders considered probable when the program was started.

## Operators Propose Two-Zone Rule for Western Kansas

*(Continued from Page 22)*

Possibilities for the application of two-zone completion would not necessarily be limited to the Lansing formation and another zone, but since the Lansing is one of the most widespread of the Pennsylvanian producing horizons over the Central Kansas uplift, it is important from the standpoint of utilizing shallow reserves.

Other witnesses who appeared before the commission were Mat J. Kirwan, Bartlesville, Okla., Indian Territory Illuminating Oil Co.; Ed A. Bacon, Tulsa, Shell Oil Co., Inc.; Russell S. Knappen, Tulsa, Gulf Oil Corp.; Colin C. Rae, Tulsa, Skelly Oil Co.; and R. L. Merrick, Tulsa, Stanolind Oil & Gas Co.

The producing of two zones through one well bore is not new, having been used as long ago as 30 years. The practice was revived several years ago in California, the main object being the elimination of sloughing of the shale interbedded between two sand bodies in the same formation. New tools which greatly facilitated this type of completion and production were developed, introduced and used. The method has received wide application in Illinois, particularly in the Louden fields and in the pools in Wabash and White counties. There are numerous areas where the method can be applied, including Oklahoma, North, West and Gulf Coast Texas and Louisiana.

The main obstacle, with the exception of California and Illinois, has been the restrictions placed on the operator by the state regulatory bodies. Lack of legal supervision has been one of the main causes for the wide application in the states named. In the states where regulatory measures are enforced, it becomes necessary to segregate the production from the two zones and method for separately producing the two zones is required. While California and Illinois operators have done this in some cases, they are not required by law to do so. Wells in Oklahoma and Texas, as well as Kansas, have been successfully produced from two zones.

The problem is not acute where large wells are obtained in both formations, but it is particularly profitable to produce both horizons through one well bore when the wells drilled to each horizon are of the marginal type. In such cases a two-zone well may be made to show a large profit where individual wells would show a loss.

●

## Wilson Reviews Mechanization Program Before Geologists

*(Continued from Page 19)*

vehicles, which will increase to 190,000 by June 30, and 286,000 by late summer or early fall. This is the number now considered necessary for an army of 1,400,000 men.

While all this sounds like a large program which would have a tremendous effect on the petroleum industry in this country, actually when it is measured against the background of the size to which the industry has grown since the last war, it is relatively small. As a matter of fact, the purely military demand to date has not offset the loss of exports due to the war.

### Production

The outstanding development in the producing end of the industry since the last war has been the general adoption of proration policies designed to conserve the reservoir energy and insure greater ultimate recovery of oil from a given formation, and a more equitable division of this recovery among the different landowners.

Today those states which have practiced sound conservation principles have built up tremendous underground reserves, available at a moment's notice for practically any emergency — and this without putting an extra load on the overburdened steel industry or the labor market to drill thousands of new wells. You may well guess that anyone locating new refineries or industries based on petroleum would naturally favor such states over those which have squandered their assets and have only a declining production to look forward to.

### 100-Octane Aviation Gasoline

Coming to the specific refinery products, the problem which has given us most concern in planning to meet Army and Navy demands is also one of the most romantic stories of our industry, viz., synthetic 100-octane gasoline.

Fortunately for the defense program, the petroleum industry, with its genius for overbuilding, has already installed synthetic capacity equal to about twice the present domestic and foreign demand, so there is today substantial excess capacity available for the building up of a reserve for possible war demand. The present capacity is, however, barely enough to meet our probable peacetime requirements, including exports, once our training program is fully under way, and not enough to fully meet present estimates of full wartime demand after our plane-building program is complete.

### Lubricating-Oil Requirements

The lubricating-oil requirements of the aviation and the Army mechanization programs will also be very substantial; however, insofar as we have been able to develop them, they will not be much greater than the export demand which has been lost. Efforts are under way to reduce the number of different specifications for lubricants and thus simplify the problem of supplying the needs of the Army in particular.

### Heavy Fuel Oil for the Navy

Heavy fuel oil for the Navy is a problem to which considerable study has been given. For a naval war in the Pacific, industry stocks and underground reserves are both more than adequate; but for a possible major effort in the Atlantic, industry supplies from domestic sources would not be adequate to meet both naval and industrial demands, even if allowables were increased on the few relatively heavy crudes available east of the Rockies. For this reason we have recommended that the Navy build up substantial additional reserves of fuel oil on the East Coast and at the proposed new bases.

Gasoline transportation by tank car and pipe line in the interior of the country is also capable of handling a substantially increased load without difficulty. In view of the possibility that interference with tanker transportation on the East Coast might well coincide with emergency demands, we have recommended to the industry the development of all possible supplemental methods of transportation to the East Coast. It is fortunate that private capital stands ready to construct two gasoline pipe lines into the southeast if legal obstacles can be eliminated. It seems inconceivable to me that one interstate carrier which employed the right of eminent domain to secure its own right-of-way should be permitted to use that right-of-way to block a competing interstate carrier. It is equally difficult to understand how the Georgia legislature could turn down the unanimous request of the president plus the secretaries of war, navy and the interior, urging that enabling legislation be passed to make possible the prompt construction of these facilities which are so important under the emergency conditions we are facing.

# MARKET RECORD OF ACTIVE OIL STOCKS . . .

Compiled by Carl H. Pforzheimer & Co., 25 Broad Street, New York City, Member New York Stock Exchange and New York Curb Exchange

## New York Stock Exchange

| 1941 High | 1941 Low | Week ended Mar. 29 High | Low | Close | Stocks— | Total shares outstanding | Par value | Latest dividend | Payable or last paid | Dividends paid in 1940 | Com. sh. earn. 1939 | 1938 | 1940 High | 1940 Low | 1939 High | 1939 Low |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50⅜ | 44 | 48⅝ | 48⅝ | 48⅝ | Amerada Corp. | 788,675 | N.P. | 50cQ | 1-31-41 | $2.00 | $1.56 | $2.07 | 58½ | 38½ | 74½ | 50 |
| 24¼ | 20¾ | 22½ | 21¾ | 22⅛ | Atlantic Refining | 2,663,999 | $25 | 25cQ | 3-15-41 | 1.00 | 1.66 | 1.40 | 27⅛ | 18¼ | 24¾ | 18⅛ |
| 10½ | 8 | 9½ | 8¾ | 9 | Barber Asphalt Co. | 390,223 | $10 | 25c | 5-21-40 | .50 | 1.39 | —.85 | 16⅝ | 8½ | 21 | 10¼ |
| 9⅝ | 7⅝ | 8¼ | 8 | 8⅛ | Barnsdall Oil Co. | 2,558,779 | $5 | 15c | 3-10-41 | .60 | .76 | 1.26 | 13⅜ | 7⅛ | 19½ | 11¼ |
| 6 | 5⅜ | 5½ | 5⅜ | 5½ | Consolidated Oil Corp. | 13,751,726 | N.P. | 12½cQ | 2-15-41 | .72½ | .55 | .55 | 8⅛ | 5½ | 9⅞ | 6½ |
| 20½ | 17⅜ | 18⅝ | 17¾ | 18⅜ | Continental Oil of Delaware | 4,682,572 | $5 | 25cQ | 3-31-41 | 1.00 | 1.35 | 1.10 | 25 | 16⅛ | 31½ | 19⅞ |
| 4½ | 3½ | 3¾ | 3⅝ | 3½ | Houston Oil | 1,098,618 | $25 | .... | 10-17-30 | .... | .43 | .83 | 6⅞ | 3⅜ | 9⅜ | 4½ |
| 11⅜ | 9¾ | 10¼ | 10 | 10 | Lion Oil Refining | 435,815 | N.P. | 25cQ | 4-15-41 | 1.00 | 1.50 | 2.09 | 14⅜ | 9 | 18⅛ | 10 |
| 15⅛ | 13⅜ | 14⅛ | 13⅝ | 14 | Mid-Continent Petroleum | 1,857,912 | $10 | 40c | 12-2-40 | .80 | 1.42 | .56 | 17⅜ | 11½ | 18 | 11⅛ |
| 11 | 9⅜ | 9⅞ | 9⅝ | 9⅞ | Mission Corporation | 1,378,645 | $10 | 25c | 12-20-40 | .25 | .87 | 1.04 | 11¾ | 7⅛ | 14⅞ | 8¾ |
| 6⅝ | 4⅞ | 5⅜ | 5⅛ | 5¼ | National Supply | 1,155,517 | $10 | .... | 12-22-37 | .... | —.87 | —.79 | 9¾ | 4⅝ | 15⅛ | 5⅝ |
| 7⅞ | 6¾ | 7⅛ | 7 | 7⅛ | Ohio Oil Co. | 6,563,377 | N.P. | 25c | 12-14-40 | .... | —.10 | .25 | 8¾ | 5⅜ | 10½ | 6 |
| 7⅛ | 5½ | 6⅝ | 6⅜ | 6⅝ | Pacific Western Oil | 1,000,000 | N.P. | 40c | 12-19-39 | .... | .81 | 1.22 | 8⅞ | 5½ | 11⅞ | 7 |
| 8½ | 7¼ | 7¾ | 7¾ | 7¾ | Pan American Pet. Trans. | 4,702,945 | $5 | 25c | 12-21-40 | .25 | 1.10 | .08 | 10½ | 6¾ | 8¾ | 5 |
| 41¼ | 35¾ | 38⅞ | 38 | 38½ | Phillips Petroleum | 4,449,052 | N.P. | 50cQ | 3-1-41 | 2.00 | 2.21 | 2.03 | 41¾ | 27½ | 46½ | 31¼ |
| 16⅞ | 14⅜ | 15 | 14¾ | 15 | Plymouth Oil Co. | 1,038,633 | $5 | 30c | 3-31-41 | ‡1.30 | 2.38 | 2.59 | 22¾ | 15 | 24 | 17⅛ |
| 8⅞ | 7 | 7⅞ | 7½ | 7¾ | Pure Oil Co. | 3,982,031 | N.P. | 25c | 12-20-40 | .25 | 1.11 | .38 | 11½ | 6¾ | 11¾ | 6⅛ |
| 9 | 7¼ | 8¾ | 8½ | 8½ | Richfield Oil Corp. | 4,010,000 | N.P. | 50c | 12-21-40 | .50 | .65 | .51 | 9¼ | 5⅞ | 10¼ | 6⅝ |
| 15⅜ | 12½ | 13⅝ | 13 | 13½ | Seaboard Oil of Delaware | 1,244,383 | N.P. | 25cQ | 3-15-41 | 1.00 | 1.40 | 1.52 | 20 | 11 | 24⅝ | 15½ |
| 12⅜ | 10⅛ | 11⅜ | 11¼ | 11⅜ | Shell Union Oil | 13,070,625 | N.P. | 50c | 12-20-40 | .75 | .77 | .72 | 13⅛ | 7⅝ | 17¼ | 9⅞ |
| 22⅜ | 18⅞ | 22⅞ | 21¾ | 21⅞ | Skelly Oil | 995,349 | $15 | 50c | 12-20-40 | 1.25 | 1.99 | 2.27 | 23¼ | 12¼ | 29½ | 15⅓ |
| 9¼ | 8¼ | 9 | 8⅝ | 9 | Socony-Vacuum | 31,206,071 | $15 | 25cSA | 3-15-41 | .50 | 1.10 | 1.29 | 12½ | 7⅛ | 15⅛ | 10¼ |
| 20¾ | 17⅞ | 20⅛ | 19¼ | 20⅛ | Standard Oil of California | 13,003,953 | N.P. | 25cQ | 3-15-41 | 1.00 | 1.38 | 2.22 | 26⅛ | 16¼ | 33⅝ | 24¼ |
| 27⅞ | 25½ | 27¼ | 26⅛ | 27 | Standard Oil (Indiana) | 15,272,020 | $25 | 25c | 3-15-41 | 1.50 | 2.23 | 1.82 | 29 | 20¾ | 30 | 22⅜ |
| 36½ | 33 | 35¾ | 35⅛ | 35 | Standard Oil of New Jersey | 27,280,998 | $25 | 75c† | 12-16-40 | 1.75 | 3.26 | 2.86 | 46½ | 29⅞ | 53½ | 38 |
| 40⅛ | 34¼ | 37 | 36⅜ | 37 | Standard Oil of Ohio | 753,740 | $25 | 37½c | 3-15-41 | 2.00 | 6.64 | 1.81 | 41¾ | 26¼ | 32¾ | 17 |
| 58¾ | 51 | 52 | 51 | 51½ | Sun Oil | 2,434,863 | N.P. | 25cQ§ | 3-15-41 | •1.00 | 2.74 | 1.07 | 65⅞ | 46¾ | 66 | 45¾ |
| 1¾ | 1⅜ | 1½ | 1½ | 1½ | Superior Oil Corp. | 1,388,979 | $1 | 10c | 12-28-40 | .10 | .04 | .24 | 2½ | 1⅛ | 3⅝ | 1⅜ |
| 40¼ | 34½ | 36⅝ | 35½ | 36½ | Texas Corp. | 10,876,139 | $25 | 50cQ | 4-1-41 | 2.00 | 3.02 | 2.13 | 47⅝ | 33 | 50¾ | 32½ |
| 6 | 5⅜ | 3⅛ | 3 | 3 | Texas Gulf Producing Co. | 888,147 | N.P. | 10c | 12-14-40 | .20 | .69 | .86 | 4¼ | 2½ | 5⅜ | 3¼ |
| 6 | 5¼ | 5½ | 5⅜ | 5½ | Texas Pacific Coal & Oil | 888,236 | $10 | 10c | 3-1-41 | .40 | 1.00 | 1.16 | 8⅝ | 5⅜ | 11⅜ | 7 |
| 10⅜ | 9⅜ | 9⅝ | 9½ | 9⅝ | Tide Water Associated | 6,371,827 | $10 | 15c | 3-3-41 | .70 | 1.05 | 1.28 | 12 | 8¾ | 14¼ | 9½ |
| 14½ | 12¾ | 13¼ | 13⅛ | 13⅛ | Union Oil Co. of California | 4,666,270 | $25 | 25c | 2-15-41 | 1.00 | 1.25 | 1.47 | 17½ | 12 | 19¾ | 15⅛ |
| 29¾ | 25⅝ | 27¾ | 27½ | 27½ | Union Tank Car Co. | 1,177,381 | N.P. | 50c | 3-3-41 | 1.75 | 2.07 | 1.16 | 29⅞ | 22¾ | 24¼ | 20⅛ |
| 1⅞ | 1⅝ | 1⅝ | 1⅝ | 1⅝ | Wilcox Oil & Gas | 470,768 | $5 | 10c | 2-15-40 | .... | .77 | .52 | 3⅝ | 1⅜ | 4¼ | 2⅜ |

•Also 5 per cent in stock. †Includes extras. ‡Also 2 per cent in stock. §Also 6 per cent in stock. —Deficit.

## New York Curb Exchange

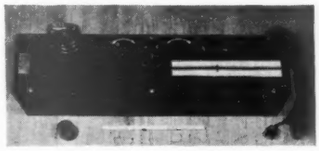
| 1941 High | 1941 Low | Week ended Mar. 29 High | Low | Close | Stocks— | Total shares outstanding | Par value | Latest dividend | Payable or last paid | Dividends paid in 1940 | Com. sh. earn. 1939 | 1938 | 1940 High | 1940 Low | 1939 High | 1939 Low |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 5⅛ | 5⅞ | 5½ | 5⅝ | American Republics Corp. | 1,308,049 | $10 | 25c | 12-18-40 | .... | $0.14 | —$0.22 | 10¾ | 4½ | 11¾ | 5½ |
| 1⅜ | 1⅜ | 1½ | 1¼ | 1¼ | Bridgeport Machine Co. | 263,700 | N.P. | $1.25 | 12-30-37 | .... | —.95 | —.14 | 3¼ | 1⅜ | 7¼ | 2½ |
| 40¼ | 38 | 39 | 39 | 39 | Buckeye Pipe Line Co. | 200,000 | $50 | $1 | 3-15-41 | $4.00 | 3.13 | 2.36 | 43 | 28 | 34¾ | 28½ |
| 110¼ | 103¾ | .. | .. | .. | Chesebrough Mfg. Co. | 120,000 | $25 | $1.50Q† | 3-31-41 | 6.00 | 7.87 | 5.32 | 117 | 95 | 130 | 108⅝ |
| 5⅛ | 3¾ | 4½ | 4¼ | 4⅜ | Cities Service (new) | 3,703,978 | $10 | .... | 6-1-32 | .... | .68 | .23 | 6¾ | 4 | 9¼ | 4¼ |
| ⅞ | ⅝ | ¾ | ¾ | ¾ | Cosden Petroleum | 465,332 | $1 | .... | ..... | .... | .... | .... | 2⅛ | ⅝ | 2¼ | ⅛ |
| 15¼ | 12½ | 13 | 12¾ | 13 | Creole Petroleum | 6,974,356 | $5 | 50cSA† | 12-16-40 | 1.00 | 1.38 | 1.64 | 24¼ | 11⅝ | 28 | 16⅜ |
| 4¼ | 3¾ | 4½ | 4½ | 4½ | Darby Petroleum | 351,390 | $5 | 25cSA | 1-15-39 | .... | .03 | .69 | 4⅜ | 2⅞ | 7⅛ | 3⅝ |
| 1⅛ | 1 | .. | .. | .. | Derby Oil & Refining | 263,162 | N.P. | .... | ..... | .... | —.37 | —.91 | 2 | ¾ | 2⅝ | 1⅛ |
| 28⅜ | 21½ | .. | .. | .. | Eureka Pipe Line | 50,000 | $50 | $3.50† | 2-1-41 | 2.25 | .63 | —.37 | 31 | 20¼ | 23 | 15⅛ |
| 33½ | 31 | 30½ | 29 | 29¾ | Gulf Oil Corp. | 9,076,202 | $25 | 25cQ | 4-1-41 | 1.25 | 1.69 | 1.43 | 39⅞ | 25½ | 45½ | 29¼ |
| 63 | 53¼ | 54½ | 53⅞ | 54 | Humble Oil & Refining | 8,987,840 | N.P. | 37½c | 4-1-41 | 2.00 | 3.33 | 3.98 | 68 | 47⅛ | 71 | 52⅛ |
| 6⅞ | 5¾ | 6¾ | 6⅜ | 6⅜ | Imperial Oil of Canada | 26,965,078 | N.P. | 25c | 12-2-40 | .62½ | .71 | .96 | 12⅜ | 5⅜ | 17 | 11⅜ |
| 3⅞ | 3⅜ | 3⅛ | 3⅛ | 3⅛ | Indiana Pipe Line | 300,000 | $7.50 | 20c | 11-15-40 | •2.80 | .33 | .47 | 7¾ | 3 | 7¼ | 5⅛ |
| 10⅜ | 8⅞ | 9⅜ | 9¼ | 9¼ | International Petroleum | 14,324,088 | N.P. | 30c | 12-21-40 | 1.25 | 1.19 | 1.98 | 10⅜ | 8¼ | 27½ | 17 |
| 2⅝ | 1¾ | 2⅛ | 2⅛ | 2⅛ | Kirby Petroleum Co. | 500,000 | $1 | 10c | 3-15-41 | .... | .06 | .14 | 2¾ | 1⅝ | 3¾ | 2⅛ |
| 10⅛ | 9⅜ | 10 | 9⅝ | 9⅞ | Lone Star Gas | 5,518,347 | N.P. | 20c | 4-22-41 | .70 | .98 | .88 | 10¾ | 7⅝ | 10½ | 7⅛ |
| 4⅝ | 4⅛ | 4⅜ | 4⅛ | 4¼ | Louisiana Land & Exp. | 2,966,762 | $1 | 10c | 3-15-41 | .35 | .22 | .45 | 6¼ | 3¾ | 7¾ | 4 |
| 10 | 9½ | .. | .. | .. | Margay Oil Corp. | 149,943 | N.P. | 25cQ | 4-10-41 | 1.00 | 1.52 | 2.28 | 17 | 9¼ | 17 | 14⅛ |
| 8 | 7 | 7½ | 7¼ | 7¼ | Midwest Oil Co. | 998,474 | $10 | 45c | 12-16-40 | .90 | .99 | .93 | 8½ | 6½ | 8¾ | 6⅝ |
| 5¾ | 5⅛ | 5½ | 5¼ | 5½ | Mountain Producers | 1,593,584 | $10 | 30cSA | 12-16-40 | .60 | .70 | .62 | 6¼ | 4⅞ | 6 | 4⅞ |
| 12⅜ | 11 | 12⅛ | 11½ | 11½ | National Fuel Gas | 3,810,183 | N.P. | 25cQ | 1-15-31 | 1.00 | .95 | .84 | 13½ | 10 | 14 | 11¼ |
| 12¾ | 10¼ | 10½ | 10½ | 10½ | National Transit | 509,000 | $12.50 | 50c | 12-16-40 | 1.00 | .91 | .88 | 12½ | 8¾ | 9½ | 7¼ |
| 1⅛ | 1 | 1⅛ | 1 | 1 | New Mexico and Arizona | 1,000,000 | $1 | 1c | 12-1-37 | .... | .02 | .02 | 1¼ | ¾ | 1¾ | 1 |
| 8 | 6⅝ | 8 | 8 | 8 | New York Transit | 100,000 | $5 | 30c | 5-15-41 | .60 | .88 | .16 | 7¾ | 5¼ | 6 | 4 |
| 9¾ | 8¼ | .. | .. | .. | Northern Pipe Line | 120,000 | $10 | 40c | 12-2-40 | .80 | .31 | .24 | 9⅞ | 6 | 7 | 4½ |
| 3⅜ | 2⅝ | 3⅝ | 3¼ | 3½ | Pantepec Oil | 2,856,872 | $1 | .... | ..... | .... | .... | .... | 5½ | 2½ | 7⅝ | 4 |
| 1½ | 1 | 1¼ | 1¼ | 1¼ | Root Petroleum Co. | 333,045 | $1 | 25c | 2-1-37 | .... | .70 | .17 | 3¼ | 1 | 5 | 1¼ |
| 2⅛ | 2⅛ | .. | .. | .. | Ryan Consolidated | 298,931 | N.P. | 10c | 12-28-40 | .... | .16 | .29 | 3 | 1½ | 3 | 1⅞ |
| 8 | 7 | .. | .. | .. | Southern Pipe Line | 100,000 | $10 | 25c | 3-3-41 | .50 | .25 | —.27 | 11¾ | 4¾ | 4⅞ | 3½ |
| 39¾ | 37¼ | 38½ | 37⅝ | 37⅞ | South Penn Oil | 1,000,000 | $25 | 37½c | 3-28-31 | 2.50 | 2.84 | 1.44 | 44 | 28 | 40½ | 26¾ |
| 30½ | 24½ | .. | .. | .. | Southwest Penna. Pipe Lines | 35,000 | $50 | 50c | 4-1-41 | 6.50 | 2.06 | —.41 | 35 | 21 | 23 | 18 |
| 20⅜ | 18 | 18¾ | 18¼ | 18⅜ | Standard Oil of Kentucky | 2,604,790 | $10 | 25c | 3-15-41 | 1.30 | 1.53 | 1.45 | 20⅞ | 16½ | 20⅛ | 17¼ |
| 1¾ | 1⅜ | 1⅝ | 1½ | 1½ | Sunray Oil | 1,975,876 | $1 | 5c | 12-20-40 | .10 | .25 | .23 | 2 | 1⅜ | 2⅝ | 1⅜ |
| 3 | 2¾ | .. | .. | .. | Texon Oil & Land | 936,024 | $2 | 10c | 12-30-40 | .40 | .49 | .56 | 3⅛ | 2 | 4 | 2⅝ |
| 2½ | 2¼ | 2¾ | 2½ | 2⅝ | Transwestern Oil Co. | 750,000 | $10 | .... | ..... | .... | —1.42 | .12 | 3⅜ | 2 | 6 | 2⅛ |
| 1/16 | 1/16 | ¾ | 1/16 | 1/16 | United Gas Corp. | 7,818,959 | $1 | .... | ..... | .... | —.55 | —.51 | 2⅛ | ¾ | 3⅜ | 1⅛ |

•Includes $2.50 capital distribution. †Includes extras. —Deficit.

# EQUIPMENT PROGRESS...

## Engineering Laboratories Offers New-Type Permeameter

Engineering Laboratories, Inc., 624 East Fourth Street, Tulsa, manufacturers of geophysical instruments and other specialized oil field equipment, offers a new



type of permeameter operating on a different principle than any similar equipment now available for core-analysis determinations. Standard rubber bushings, containing the core sample, are quickly clamped into the permeameter core holder. A hand wheel is turned in the direction indicated by the pilot lights. This is the only manual operation; there are no gages or meters to watch.

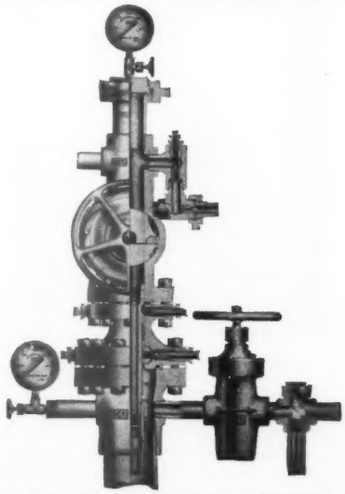
Permeability of the core is read directly in millidarcys and no calculations are required if a standard core size is employed. For odd-shaped samples one determines permeability by a single multiplication with the length-area ratio.

This permeameter is entirely independent of variations which require careful consideration in the classical method of permeability determination. Sensitivity and accuracy are comparable with meters now in use. The instrument is inherently free from variations in humidity and temperature. No liquids are employed and leveling is irrelevant. Air flow through the sample remains in the laminar region without attention of the operator.

The instrument is self-contained and portable. No external air supply is required and the total weight is about 50 lb. A flexible cable plugs into a 110-volt a.c. or d.c. socket and the instrument is ready for operation. Specifications and prices on the Hayward permeameter will be furnished on request.

## O-C-T Completion Assembly Features Improved Accessories

The O.C.T. christmas-tree assembly shown in cross-section herewith employs several unusual mechanical features. Foundation for the assembly is provided by



an O-C-T Type T-20 tubing head with Type F-1 attachment. Note that the Type F-1 attachment features retractable tubing-hanger seats and lockdown screws in its lower and upper flanges, respectively. The retractable hanger seats permit tubing collars and tubing hanger to pass through the head to facilitate washing behind liner and setting packer.

After drilling plug or gun perforating, a few joints of tubing with liner and packer made up on the first joint are lowered in the hole through the tubing-head the entire christmas-tree manifold. An O-C-T stripper nection of the Type F-1 attachment, is then stripped over the tubing and made up on top of the tubing-head body. From this point on, the tubing is run through the entire christmas tree manifold. An O-C-T stripper rubber-type blowout preventer is usually installed on the top of the christmas tree to provide blowout protection while tubing is being run and landed, the tubing collars and hanger readily passing through the stripper-type packoff. The blowout preventer also serves as a stuffing box while washing behind the liner.

After washing behind liner and setting packer, tubing is raised to suspension point and the retractable seats are screwed in to engage the hanger. Lockdown screws are screwed in to hold the hanger down securely on the seats. Weight of the tubing string expands a packing ring on the hanger to effect a seal.

Note in the illustration of the christmas-tree assembly the O-C-T cylinder-gate valve flanged above the tubing head. Obviously, this valve readily passes the tubing hanger. Particular attention is directed to the extended cross made integrally with the valve body which eliminates a separate flow cross.

The O-C-T Type FT-816-N flow tee shown screwed into one side of the extended valve end is of entirely new design. Note that it embodies a needle valve and positive choke assembly in a single compact unit, thus eliminating a conventional gate valve and separate choke assembly. The O-C-T Type B-10-A bottom-hole test adapter provides a proven safe fast connection on top of the christmas tree.

The diagram also illustrates the use of an O-C-T cylinder gate valve on the casing outlet of the tubing head with an O-C-T flow cross, cage nipple and flow-bean assembly installed to the right of the valve. This assembly provides safe control while the well is being washed into production. Note that the O-C-T Type FC-102 flow cross, like the bottom-hole test adapter, is provided with a quick change cap to permit speedy replacement of the flow bean when required.

## New Grove Regulator Plant and Offices

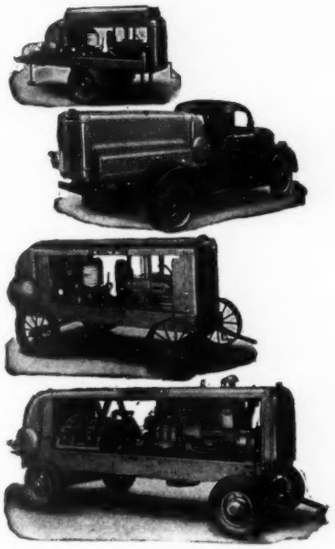
The Grove Regulator Co. has recently moved into its new modern offices and plant located at 1190 Sixty-seventh Street, Oakland, Calif. Embodying the very latest in plant design and construction, the new structure provides vastly enlarged engineering, production, and testing facilities. According to M. H. Grove, president of the firm, the expansion is necessitated by the steadily and continuously increasing business in the petroleum as well as in other industries.

One of the features in this new factory is a complete, up-to-the-minute testing laboratory, which is considered one of the finest of its kind. It is manned by an experienced and competent staff of chemical and metallurgical engineers. A new 10,000-lb. hydraulic testing unit and an automatically controlled testing boiler, capable of developing heat temperatures up to 1,000° F. and 2,000-lb. pressure, have been installed. Now nearing completion is a new heat-treating furnace which will insure closer supervision and greater uniformity of the Grove high-pressure regulators.

Batteries of new machines have been installed throughout the plant, and additional units are on order to facilitate still higher production capacities and faster output. A further addition which will increase the present floor area is contemplated.

## Chicago Pneumatic Line of Compressors Now Streamlined

In keeping with the modern trend toward streamlining, the Chicago Pneumatic Tool Co. is now offering its complete line of portable compressors of stream-



lined design. This complete line of compressors is covered in a 28-page bulletin (No. 758) recently issued by the company, copies of which are available upon request to the company at 6 East Forty-fourth Street, New York. Its various types of compressors, illustrated in the accompanying cut, are described and specifications given in the new bulletin.

The unit shown at bottom is a new 500-cu. ft. model, diesel driven, which has been added to its line. This model, Class PO 8, will operate at full capacity and 100-lb. discharge pressure at a fuel cost of only 41½ cents per hour, based on fuel-oil cost of 6 cents per gallon. The compressor is a true V-8, having two low and two high-pressure cylinders located on each side with an included angle of 90°. One low and one high-pressure connecting rod operate on each side of the four crank pins. Other features are Simplate valves, inlet-valve unloading, pressure lubrication, multiple-disk clutch, and sectional intercooler.

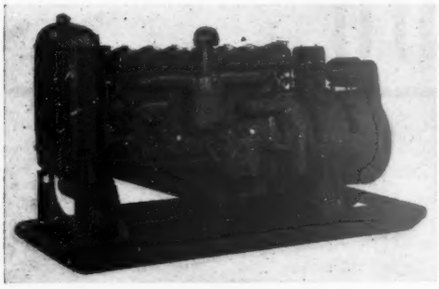
## Axelson Manufacturing Co. Completes New Unit

Completion of the first step in the expansion plans of the Axelson Manufacturing Co. has just been announced by J. C. Axelson, president. The first project finished has been the removal of the entire engineering department from the general administration building to a newly finished structure to be devoted entirely to engineering-department operations.

This building, 35 by 135 ft., especially constructed to house the engineering department, has the latest designing rooms and equipment. The most up-to-date arrangement provides the latest in lighting, both natural and artificial. The building has a working space of 4,720 sq. ft. "This expansion was necessary," said President Axelson, "to provide more office room in our general office building and to facilitate the expansion in our engineering personnel. This situation was brought about by the increased business in Axelson's pumps and lathes."

## Murphy Offers Line of Diesel-Generator Sets

A complete line of diesel-generator sets is offered by the Murphy Diesel Co. of Milwaukee, Wis.; the sets are compact, are complete with all essential operating



controls, are capable of producing high quality current at full rating continuously with 25 per cent overload capacity available for intermittent use. Designated as Models ME-4, ME-6 and ME-650, the units are rated at 55, 85 and 200 kw., respectively. The generating set illustrated is designated as the Model ME-6 with skid mountings.

Each Murphy diesel a.c. generator set of the type pictured consists of the four-cylinder 105-hp. Model ME-4, the six-cylinder 160-hp. Model ME-6 or the supercharged six-cylinder 200-hp. Model ME-650 Murphy true diesel engine direct connected to a steel frame, single-ball bearing, 1,200 r.p.m. a.c. generator. The generator frame as shown bolts directly to the flywheel bell housing and a piloted flexible coupling joins the engine flywheel of the generator armature. The belt-driven exciter mounted on top of the generator frame is of the high-speed type to provide optimum response to the voltage regulator. The voltage regulator is included as standard equipment on these sets and is mounted in a compact steel cabinet together with a voltmeter and ammeter, a polarity-reversing switch and a voltage regulator on and off switch on the generator frame in close proximity to the engine control.

## TRADE LITERATURE

HERCULES MOTORS CORP., Canton, Ohio.—New Power-Unit Catalog and Application Field Book, offering suggestions which may be helpful in the proper selection of power units. In addition to complete factual data covering Hercules 6, 4, and 2-cylinder gasoline and diesel power units—including dimensional views, power curves, working-load tables, and complete specifications—the book contains much general information of interest and value to all power users. The 76-page book is carefully arranged for quick reference as to illustration and text.

BROWN INSTRUMENT CO., Wayne and Roberts Avenues, Philadelphia, Pa.—Catalog 15-E dealing with Brown pyrometers, millivoltmeter type. This catalog is well illustrated with large, clear photographs of indicating, recording, and control millivoltmeter pyrometers. Constructional features and operating advantages are fully described. It also contains photographs and descriptions of Brown diesel-engine pyrometers, marine-type pyrometers, and portable pyrometers.

LANE-WELLS CO., Los Angeles, Calif.—March 1941 issue of "Tomorrow's Tools Today," featuring "Oil For All Our Tomorrows" and "The Amazing Underworld of the Southwest" (a description of the Carlsbad Caverns). Also described are Lane-Wells Olympic packers.

JOHNS-MANVILLE, 22 East Fortieth Street, New York—Form FM-7A, a new illustrated brochure, "Industrial Friction Materials," giving comprehensive data on complete lines of industrial brake linings and blocks and clutch facings which it manufactures for all types of industrial equipment. The most important feature of this brochure is a chart which simplifies the selection of the most suitable friction material for any specified service. On this chart are represented brakes and clutches of the disk, cone, and band types. Listed down one side of the page are all of the factors which must be considered, such as rubbing speed, drum temperature, pressure, etc. If one knows the service conditions which must be met, he can look them up on this chart and, by glancing horizontally across the page, automatically pick out the correct friction material for his purpose. Supplementing this technical chart is another showing recommendations for specific types of clutches and brakes; also a third table giving the coefficient of friction, size limits, thickness, tolerances, and recommended service conditions for each of the various types of J-M industrial brake linings and blocks and clutch facings.

AMERICAN CONCRETE & STEEL PIPE CO., Box 3428, Terminal Annex Post Office, Los Angeles, Calif.—16-page catalog, "Amercoat—Plastic Coatings," explaining in type and pictures, the diversified uses to which Amercoat may be put in modern industry. Amercoat, defined briefly as a sprayable plastic coating which is corrosionproof and noncontaminating, is disclosed by the manufacturer's brochure as being useful and highly profitable for an amazing range of things.

AIR REDUCTION, 60 East Forty-second Street, New York.—16-page folder giving an interesting review of how welding decreases the weight and cost of structural steel . . . how it saves material in structural connections . . . provides greater freedom in architectural and structural design . . . eliminates cost of punching and drilling holes, reduces handling of heavy pieces in the shop . . . eliminates noise which is disagreeable to occupants of nearby buildings and confusing to workers in shop and field . . . facilitates remodeling and making offices with minimum removal of existing walls and floors . . . reduces corrosion and cost of painting and maintenance of exposed steel. These various advantages of welding are illustrated specifically in a four-page magazine article reprint featuring the construction of the Airline Terminals Building in New York City. Designers will be particularly interested in two pages of fundamentals of design for welded construction. This section will aid in application to specific jobs on hand. The last several pages are devoted to the Airco electrodes and Wilson arc-welding machines which are recommended for this type of work.

INTERNATIONAL DERRICK & EQUIPMENT DIVISION of International-Stacey Corp., Columbus, Ohio.—New catalog showing types, construction details, typical applications, and specifications of IDECO steel buildings. Information contained in this new catalog will be found valuable by anyone interested in either permanent or temporary buildings for industrial expansion, airport buildings, storage space, buildings for field operations and a wide variety of housing needs. The wealth of illustrations showing applications and the careful reproduction given all detail, together with the condensed specifications and other data contained in the catalog, greatly simplify the selection of building types. A copy of the catalog may be secured by writing to the Columbus, Ohio, headquarters of the company, or one of its district sales offices in New York City; Dallas, Tex.; Houston, Tex.; Tulsa; or Los Angeles, Calif.

EASTERN ENGINEERING CO., 45 Fox Street, New Haven, Conn.—24-page catalog describing and illustrating mixing equipment for industrial applications. One section of this catalog has been donated to important engineering data on the selection and adoption of mixing machinery. On these pages are discussed: Power required, high speed versus low speed, single versus dual propellers, vertical versus side entering mountings, and other information valuable for selecting correct equipment. These detailed data cover the essential features and advantages of modern methods of agitation. The catalog includes complete descriptions and illustrations of electrical fluid mixers in all sizes and types, ranging from 1/1,000 hp. to 25 hp. A section of blueprints furnishes dimensional data on various styles, such as portable, vertical, and side entering. Another section is devoted to several related items in fluid handling, and presents in detail midget centrifugal pumps, sump pumps, air-powered mixers, transfer pumps, and temperature controls.

CATERPILLAR TRACTOR CO., Peoria, Ill.—A new booklet about precision-manufacturing methods, giving a clear view of the care and accuracy that is necessary to produce machines that meet that company's rigid standards. "Caterpillar's" instruments and methods—many of which are photographed and publicized for the first time—work to within a few millionths of an inch of absolute accuracy. The machines and gages which are necessary for this kind of production are discussed and photographed. Superfinishing of crankshafts, gear manufacturing to 1/10,000 in. of accuracy, pretesting of steels, track-link accuracy, chromium plating 20 times as thick as that used for decoration, and numerous other "Caterpillar" practices are described. A chapter is devoted to metal hardening by high-frequency induction. Foundry practices and the maintenance of welding quality are among the other things discussed. The two-color booklet is profusely illustrated, and is written in easy-to-understand language.

## Pittsburgh Equitable Announces National Meter Division

Believing that the interests of the petroleum industry would be more adequately served by having one company making a complete line of all types and sizes of meters, the directors of the Pittsburgh Equitable Meter Co., of Pittsburgh, Pa., have purchased the assets of National Meter Co., of Brooklyn, N. Y., thereby bringing together, under one management, the facilities of two of the country's oldest meter manufacturers. The National Meter plant will be operated as a division of the Pittsburgh Equitable Meter Co. This action was ratified by the stockholders of the National Meter Co. and the deal closed at a meeting of the principals held on March 17.

Both Pres. W. F. Rockwell of the Pittsburgh company, and Pres. N. J. Kenny of National, have emphasized the completeness of the line of meters which this purchase makes possible. Buyers can select from the nine different types made by both companies. These include flat and conical nutating disk; oscillating, reciprocating and rotary piston; screw-propulsion; current and compound types. Every commercially manufactured type of liquid meter is now represented in the complete Pittsburgh-National line.

Of interest is the fact that there is no overlapping between Pittsburgh products and those made by National. Structural differences and design features in meters identified by trade names, and popularized during many years of separate operation, will be continued as the Pittsburgh-National line. Prompt deliveries of both new meters and parts for any of the existing types can be obtained from Pittsburgh Equitable or its National division.

No change is contemplated in the personnel. The same salesmen will continue to contact their customers in their respective territories. Additional district office and warehouse facilities with adequate inventories, should provide greater service and convenience for the trade. Manufacturing plants are located in Pittsburgh, Hopewell, N. J.; Columbus, Ohio; Oakland, Calif., and Brooklyn. These plants have been thoroughly modernized within the last few years and are equipped with the latest types of machine tools for the manufacture of precision meters.

## American Issues Bulletin on Liquefied-Petroleum-Gas Meters

American Meter Co., 60 East Forty-second Street, New York, recently issued a 16-page bulletin dealing with the essentials of liquefied-petroleum-gas metering

practices, designed for easy reference and generously illustrated. Especially helpful is a section devoted to specifications for ordering LPG meters. It is based directly upon the company's experience in providing—from the very beginning of the industry—specially constructed meters in a range sufficiently wide to cover all butane-propane applications. The bulletin also deals with the importance of LPG metering, and special LPG indexes and other features.

# AMONG EQUIPMENT MEN...

## Two Promotions Announced By Engineering Laboratories

Announcement is made by Engineering Laboratories, Inc., Tulsa, of the election of R. P. Green, chief engineer, to vice president and chief engineer. W. R. Coleman, general manager, has been made secretary and treasurer of the company.

*R. P. GREEN* *W. R. COLEMAN*

Mr. Green, a registered professional engineer, has been associated with E.L.I. and Seismograph Service Corp. for 10 years and he will continue also as chief engineer at S.S.C. As chief engineer, he has been responsible for the high engineering standards maintained at E.L.I. in the precision manufacture of equipment used in many divisions of the petroleum industry.

When Mr. Coleman joined the organization in March 1935, there was a total of 11 employes. Today this employment list numbers 83. The company's rapid growth and recognition as one of the country's outstanding specialist manufacturing concerns has, to a great extent, been due to the ability of Mr. Coleman in handling the company affairs in the capacity of general manager. Mr. Coleman, before joining the organization, was with the Spartan Aircraft Co., and prior to that with the old Prairie Pipe Line Co.

## Rollans Made General Sales Manager of Wickwire Spencer

The Wickwire Spencer Steel Co. and its subsidiary, the American Wire Fabrics Corp., with combined general offices at 500 Fifth Avenue, New York, announce the appointment of Dean Rollans as general sales manager. Mr. Rollans assumes all responsibilities previously carried by A. G. Bussmann who has resigned because of ill health.

Conway Studios, Inc., New York

Mr. Rollans received his formal education at the University of Arkansas at Fayetteville. Shortly thereafter, he accepted a position with the International Supply Co. of Tulsa as assistant credit manager, which position he filled for 8 years until he transferred directly to the Wickwire Spencer Steel Co. in 1928. In 1930 he was promoted to the position of general credit manager and assistant treasurer. In this capacity for 13 years he constantly extended his activities to many phases of the company's management and has been throughout these years an increasingly vital force in the determination of company policy.

## Geare Joins Thermoid Co.

R. E. Spencer Geare, mechanical engineer, is now connected with Thermoid Rubber Division of Thermoid Co., Trenton, N. J., according to an announcement made by F. E. Schulter, president.

Mr. Geare is well known throughout the industry as an authority on V-belts, V-belt drives, and power transmission, and has specialized in that field for the past 10 years. During the past 25 years he has held sales and engineering executive positions with several well-known companies. Mr. Geare's association with Thermoid is part of that company's program of improvement and expansion of its industrial rubber products line. He will concentrate on the improvement of Thermoid's multiple V-belt and F.H.P. belt programs and the expansion of V-belt sales.

## L. O. Weaver Appointed Maloney Tri-State Representative

The Maloney Tank Manufacturing Co., Tulsa, announces the appointment of L. O. Weaver as district manager for Illinois, Indiana, and Kentucky. Mr. Weaver has had many years experience in the tank and separator business and has spent several years in the Tri-State area. He has established headquarters at Evansville, Ind. Warehouse and stocks are maintained at Grayville, Ill.

## BUSINESS NOTES

Frick-Reid Supply Corp., Tulsa, has announced the opening of a new store at Sandyville, W. Va., to serve the Oriskany sand area. Morgan Wilkins has been appointed store manager, acting under the supervision of F. M. Fisher, district sales manager, at Pittsburgh, Pa.

A number of sales-department changes are announced by the general sales manager of Norton Co., Worcester, Mass. R. O. Anderson has been moved from district manager in Pittsburgh to Worcester where he will report directly to W. R. Moore, general sales manager. C. B. Price has been changed from the southeast section to district manager at Pittsburgh. Lorin W. Grubbs who has been assisting Mr. Price in the eastern part of his section will continue to serve that area and Zachary M. Almand from sales-engineering department at Worcester will take over the western part of this territory; G. T. Taylor, from New York City area to the Chicago district; J. S. Anderson from Pittsburgh to New York; W. A. Russell, field engineer in Pittsburgh, will take over Mr. Anderson's Pittsburgh sales territory; J. L. Tobey of the sales engineering department at Worcester becomes field engineer at Pittsburgh; J. E. Strachan. Jr., recently field engineer in New England, has been assigned as a salesman in southern Ohio.

Henry A. Winland has been named sales manager of Alten's Foundry & Machine Works, Lancaster, Ohio, according to an announcement by George H. Alten, owner of the firm. Taking up his new duties after 8 years of field selling experience, Mr. Winland has traveled in all major fields of the country in the interest of Alten pumping units, casing heads and stuffing boxes. Prior to his present connection, he spent 11 years with the Oil Well Supply Co. and other manufacturers and supply companies. Alten's Foundry & Machine Works is a name well known throughout the oil country, the firm having paralleled the growth of the oil industry through a steadily growing clientele for its lines of pumping equipment and specialties ever since its inception, 52 years ago.

Appointment of G. D. Groce, formerly of Cleveland, Ohio, as general service manager of the Buda Co. at Harvey, Ill. (Chicago suburb), was announced by R. K. Mangan, executive vice president. Mr. Groce has been connected with the automotive industry in a manufacturing and engineering capacity for many years and during the past 10 years, was service manager of the Cleveland Tractor Co. He has traveled extensively in the United States and abroad. He and his family will reside at Olympia Fields.

Industrial Scientific, Inc., Fort Worth and Houston, Tex., announces the acquisition of the Industrial-Scientific Supply Co., Division Fort Worth Laboratories, effective January 1, 1941. Incorporated under the laws of the State of Texas by B. H. Wilson, Roy E. O'Neill, and Fred Wellborn, Industrial Scientfic, Inc., will continue sales and service of Taylor instruments, Pyrex and Kimble glassware, Baker & Adamson reagent chemicals, Marsh gages and laboratory apparatus and equipment. Offices will be maintained at 828½ Monroe Street, Fort Worth, and 1302 Dallas Avenue, Houston, with stocks at both localities.

The Rike Co., 1518 Hemphill St., Fort Worth, Tex., has announced that effective April 1, 1941, the name of the company has been changed to Plastelite Engineering Co. There were no changes in personnel or in the company's operations.

The United Geophysical Co. of Pasadena, Calif., headed by Herbert Hoover, Jr., has established a division office in Tulsa at 805 Thompson Building from which business of the company will be handled for the Mid-Continent and Gulf Coast areas. Hugh C. Schaeffer, vice president, will be in charge of the office. Mr. Schaeffer was formerly employed in geological and seismograph work for the Mid-Continent Petroleum Corp. for more than 18 years.

## Haering Increases Personnel, Announces Promotions

Increased sales and the initiation of a broadened service-representation plan have necessitated the addition of several chemists and engineers to the service organization of D. W. Haering & Co., Inc., 2308 South Winchester Avenue, Chicago. Several promotions in the organization include H. C. Daggett, promoted to eastern divisional manager in charge of the New York City office at 159 East Thirty-fourth Street, and D. R. Walser promoted to Chicago area manager. Two engineers, E. V. Zellers and P. V. Sanders, were added to the Chicago sales organization, and C. La Follette was made sales engineer at South Bend, Ind.

Eastern expansion includes the additions of W. E. Schaffnit with offices at 1109 Otis Building, Philadelphia, Pa., and J. B. Cropsey with headquarters at Pomfret Center, Conn. Walter Peffer was appointed sales engineer in the Pittsburgh territory with a new sales office at 207 Investment Building, Pittsburgh, Pa. G. I. Thomas, Dallas, Tex., has been added to the staff of representatives in the Southwest.

R. M. Place has been added to the staff of chemists at the Chicago laboratory to assist in the recently expanded research program.

## Olive Dorroh Made Sales Director Of Wilson Supply

Olive Dorroh, of Wilson Supply Co., has been promoted to the newly created position of sales director for all of the Wilson Supply Co. branch stores. Mr. Dorroh has been with Wilson Supply for the past 16 years, having come up through all departments of the company.

## Changes in South Chester Tube Co. Personnel

L. A. Estes has been elected president of South Chester Tube Co., succeeding the late Gustavus W. Cook. Mr. Estes was formerly executive vice president. John W. Lawton, continuing as secretary, has also been elected treasurer, succeeding Francis J. Tucker, who is joining the sales department as special representative.

# CLASSIFIED ADVERTISING

THE MARKET PLACE OF THE OIL INDUSTRY . . .

### Patent Attorneys

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**323-324 Insurance Bldg., Fort Worth, Tex.**
**212 Kellogg Building, Washington, D. C.**

### Leases and Drilling Blocks

LEASES—East Texas, La., South Ark. 20 acres up, dollar acre up.—Owners—Address Attorney. Box 1122, Little Rock, Ark.

EAST TEXAS Woodbine-Trinity sand wildcats starting. Leases afford 10 to 50 for 1 bet. Has already happened past 60 days. E. CROFT, PROCTOR, TEXAS.

FOR SALE Oil and gas leases and small production located in Kentucky shallow field, also tracts of proven Fluorspar and zinc deposits. Reports on request. W. P. HARLEY, Bowling Green, Kentucky.

**INVESTIGATIONS, REPORTS AND MAPS**
**On producing or nonproducing oil land in Louisiana. Nominal fee.**
**Petroleum Service Bureau**
**606 Gravier St., New Orleans**

WARD-Crane sec. 18B 28, near Silurian test; cheap fee or lease. J. G. Smith, 215 Littlefield Bldg., Austin, Texas.

NEW MEXICO
Oil and Gas Leases and Royalties
ROY G. BARTON, Hobbs, N. M.

HOMER L. FITCH, GEOPHYSICIST AND LOCATION ENGINEER
WHY drill dry holes? Our method only locates structures which contain oil or gas. Drawer 711, Brownsville, Texas.

NEW MEXICO
STATE OIL AND GAS LEASES
FORTY acres and multiples thereof. Near major company lease blocks. Five cent rentals. Ten Year term. Write for information.

HARRY S. WRIGHT
New Mexico State Lessee
Farmington, New Mexico.

FOR SALE: 4,000 acres leases north end Fannin County, Texas. 21 miles southeast Cumberland Pool. Bargain. BURTON N. WORK, Box 265, Denison, Texas.

LEASES & ROYALTIES. New field in western N. Dakota. Get in now while prices are low. The Willoymer Co., Center, N. Dakota.

WATER FLOODING proven most successful method of recovery. Results outstanding, no failures. Small leases made to produce upwards 400 Bbl. daily. Low cost, high returns. No gamble. 85% of possibilities still in sand after pumping 25 years. Possible to recover 50% of remaining. Have several leases with excellent sand bodies from 400 to 750 feet deep. Write H. B. Snyder, Box 126, Ottawa, Kansas.

LEASES AND ROYALTIES
Large and Small Acreage in and adjacent block leased by major company
P. O. BOX 272, CONVENT, LA.

PECOS COUNTY TEXAS ACREAGE: Can deliver new 10 year lease on 5100 acres about 28 miles East Fort Stockton cheap. Address P. O. Box 372, Jasper, Tex.

60 ACRES Semi Proven lease for development, on override bases in Texas. Wells flow. Box A-432, The Oil and Gas Journal, Tulsa, Okla.

### Leases and Drilling Blocks

1440-A. Oil and Gas Lease in new hot area near major Co. drilling operations, California. Drilling proposition or cash sale. P. O. Box 762, Oakland, Calif.

OIL water flooding offers a sure and profitable return; have drilled leases ready for flooding and good indrilled proven leases ready for coring. H. W. Mitchell, Osawatomie, Kansas.

**INVESTIGATIONS—REPORTS**
**SURVEYS—MAPS**
**Producing and Nonproducing properties in Texas.**
**OILFIELDS SERVICE CO.**
**Box 2951 Houston, Tex.**

RARE Opportunity, large concession of unlimited acreage, South America, forming company, no taxes, no royalty, steady market, rich in oil, future large returns. Absolutely safe. Address Helm, 5002—11th N.E., Seattle, Wash.

FOR SALE: Oil and Gas leases 100 to 1000 acre blocks in Clinton Co. Ky. New oil field near proven production with machines drilling now. 50 cents to one dollar per acre, also 1000 to 3000 acres not so near production, 25 cents per acre, 5 yr. leases. John A. Damron, Albany, Ky.

WILL sacrifice for quick sale account of health, Lea County, New Mexico 40 acres each Sections 15 and 21, 17S-36E. Lock Box 126, Vinton, Va.

### Mailing Lists

ROYALTY owners, Oil Investors, Unit holders, Stockholders in Oil and Royalty Companies. Personnel lists of every branch of oil industry. All by States. We buy lists. New catalogues ready. Oil Industry Mailing List Co., Tulsa Loan Bldg., Tulsa, Oklahoma.

### Business Opportunities

A REAL opportunity if you can finance an oil developing project with $5000 to $10,000, 800 to 2000 ft. Unlimited future. D. H. Reavis, White Bluff, Tenn.

### Geologic Survey

U. S. and State lists of Geological publications available FREE upon application. Cornwall's Book Store, 723 11th Street N. W., Washington, D. C.

### Help Wanted

WANTED experienced refinery designing draftsmen, permanent. Salary. Box A-436, The Oil and Gas Journal, Tulsa, Okla.

### Situations Wanted

PRODUCTION SUPERINTENDENT—20 years experience, good references from major company. Go anywhere. Available immediately. Box A-402, The Oil and Gas Journal, Tulsa, Okla.

ATTORNEY, geologically trained, experienced in the oil business, widely acquainted in southwest Texas, desires position with an oil company interested or planning activities in that area. Box A-410, The Oil and Gas Journal, Tulsa, Okla.

REF. ENG.: Supervisor, 11 yrs. broad and gen. ref. exp. in lubes, naphthas, gasoline, wax, distillation and cracking; now employed, desires change. Exp. incl. research, ref. inspec. chief chem. proc. eng.; ability demonstrated. Reply Box A-411, The Oil and Gas Journal, Tulsa, Okla.

SALESMAN, 7 years' experience in sales department of refineries and brokers wishes to make change. Desires connection in Southwest. Good reference. Address Box A-422, The Oil and Gas Journal, Tulsa, Okla.

MECH. ENGR., 5 years' experience in design, maintenance, and operation of precision instruments. Wishes employment in design or development of oil country equipment. A-400, The Oil and Gas Journal, Tulsa, Oklahoma.

PROMOTERS, oil, mining. Letter writer 15 yrs., own typist. Let me convert those inquiries into sales. Box 360, Okla. City.

DISTRIBUTOR OR SALES AGENT
Accounts wanted by Sales Executive from Manufacturers or Distributors of Oil Well Supplies not represented in Tulsa. Well acquainted in Oklahoma and Kansas. Established record for producing results. Will open office and personally contact the trade, giving dignified and satisfactory representation. Method of compensation to be agreed upon. Box A-434, The Oil and Gas Journal, Tulsa, Okla.

FIELD GEOLOGIST—Geophysicist, 28, now with major Co., 6 yrs. field exp. incl. 3 yrs. in So. Amer. Want new connection in Peru, Chile or Argentine. Sp. fluent Spanish. Box A-435, The Oil and Gas Journal, Tulsa, Okla.

### Geophysical Service

WHY does the needle of the compass point North? Why do the Geese fly North in the Spring How does the Bird Dog point Quail? It must be a natural law in operation. Newton's Law and Relativity are facts. It is a fact that Oil and Gas are located by a Direct Geophysical Method. Locate your next well this way and have a producer, not just a hole in the ground. Gravitational Selector, 14957 Lakewood Heights Blvd., Lakewood, Ohio.

### Royalties

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma

**Brokers—Salesmen**

Sell in the most active area in the United States—The Permian Basin of West Texas and Southeastern New Mexico. From the standpoint of royalty investors this area has much to offer. Can supply you with choice non-producing royalties located on geophysical highs. Also drilling blocks, close in acreage to production, or wildcat leases. I maintain my own field men who cover this area for me. All offerings meet the requirements of the Security and Exchange Commission. Inquiries invited.

**B. D. BUCKLEY**
Paul Brown Bldg., St. Louis, Mo.

WE MAINTAIN A MARKET FOR REGISTERED DEALERS IN ALL TYPES OF OIL ROYALTIES
**FIRST DEPENDABLE OIL CORP.**
**522 Fifth Ave., New York, N. Y.**

### Oil Industry Printing

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

### Ranches—Farm Lands

WHY not invest in a New Mexico ranch? Have from 2 to 200 sections. Write me for full descriptions.
J. T. TRIGG, Lubbock, Texas.

SACRIFICE 5,000 A. Rich Colo., Prairie land. 40 to 640 A. tracts. Good titles. $2.50 Acre. Address: Owner, 2644 Rimpau Blvd., Los Angeles.

### Incorporations

DELAWARE CHARTERS: Complete service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

CAPITAL SEEKERS
Put your project before 260 Key-Men. Cost trifling. Details free. AMSTER LEONARD, Fox Theater Building, Detroit, Michigan.

### Legal Blanks

BURKHART'S legal blanks and general forms serving Mid-Cont. oil field since 1908—Okla. Kans. N. Mex. Tex. Ala. Ark. Fla. Ga. Ill. Ind. Ky. La. Mich. Miss. Mo. Neb. N. Dak. Tenn. Wyo. Free catalog samples on request. Burkhart Ptg. & Sta. Co., 115 S. Cinn., Tulsa, Oklahoma.

### Equipment Wanted

WANTED TO BUY—Preferable delivered and erected Eastern Seaboard, Good Used Storage Tanks for small water terminal; sizes 5, 10 and 20 thousand barrels or what have you. Also 6 and 8 inch pipe and fittings, etc. Advise what you have to offer for sale to Box A-431, The Oil and Gas Journal, Tulsa, Okla.

WE ARE interested in buying for cash 100 to 150 tons, of light used, fishing and drilling cable tools, all kinds, suitable for spudders to drill up to 2,000 feet deep. Prices by the ton F.O.B. cars, not to exceed $20.00 per ton. Buyer will inspect personally. Will leave Cuba about May 18. Write for detailed list and specifications to: Oil Well Drilling Co., Apartado No. 15, Los Arabos, Cuba.

### For Sale—Equipment

FOR SALE AT OKLAHOMA CITY—2—6' diameter 38' high 16 tray Southwestern Eng. absorbers. Ser. #6389-90. $1,000.00 each. I.T.I.O. Co., Bartlesville, Okla.

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**THE OIL AND GAS JOURNAL**
**Tulsa, Oklahoma**

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**BUBBLE TOWER—6' 6" Dia. by 72' High by 3/8" Shell; 24 Trays; Foster Wheeler Construction—2,300 Bbl. Per Day Capacity**

**VAPOR TOWER—5' 6" Dia. by 50' High by 1/2" Shell; 3 Baffles at Top**

**New M. W. KELLOGG HEAT EXCHANGERS—VERTICAL; 1240 Sq. Ft. Surface; Each Complete With Structural Supports**

***Write Immediately for Further Details***

## SONKEN-GALAMBA SUPPLY COMPANY

W. C. Berry and H. J. Galamba
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FOR SALE: At our Oklahoma City warehouse slightly used Cardwell KS DHS skid type oil well servicing unit equipped with DHK Waukesha motor. I. T. I. O. Co., Bartlesville, Okla.

**FOR SALE**

One gasoline drilling rig with two 85 H.P. Waukesha motors and unitized draw works complete.
300 sets 3" A.P.I. tool joints.
10,000 Ft. 7" O.D. 26# seamless casing, once run.
15,000 Ft. 4½" O.D. seamless drill pipe equipped with both regular and full hole tool joints.
In addition to the above we have 20,000 Ft. of 6" screw line pipe in Oklahoma; also drilling rig capable of drilling to 6500 feet, complete stock of line pipe, casing, drilling and pumping equipment.

Wire, Write or Phone for Prices.

**Louisiana Iron & Supply Co.**
**Shreveport, La.**

FOR SALE OR RENT: Gas engine powered Rotary Drilling Rig complete. Suitable for 4,500' drilling. Box 1360. Phone 312, Seminole, Okla.

FOR SALE: 1—Cardwell Skid Unit, 2—10 x 4½ x 10 Chicago Pneumatic Compressors, 10,000 ft.—5¾" OD Plain End Pipe; Williams Supply Co., Bartlesville, Okla.

FOR SALE: 8—90 H.P. Superior Twin Gas Engines with direct connected compressor 11½ x 16 and 5½ x 16 complete. Leonard Smith, 1910 First National Building, Oklahoma City, Oklahoma. LD 459 or 2-5415.

FOR SALE — At Oklahoma City — 11 6" and 8" Byron-Jackson built-in motor pump heads for use in operating deep-well turbine pumps. I. T. I. O. Company, Bartlesville, Oklahoma.

**FOR SALE**
**COMPRESSORS**

From 100# to 2,000# discharge pressures in capacities from 100 cu. ft. to 3000 cu. ft. per minute either belted or direct connected gas, electric or Diesel types.

**ELECTRIC MOTORS**
25 Cycle and 60 Cycle
From 75 to 250 HP

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From 50 to 500 HP

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*We guarantee the condition of all equipment rebuilt by us.*

CROWN BLOCKS: All types light and heavy duty production and cable tool—Real Bargains. Lucey Products Corp., Tulsa, Okla.

ONE twenty thousand bbl. capacity, A.P.I. specification. steel tank, perfect condition. Also seven fifty-five thousand bbl. tanks, steel roofs. Good condition.
BOX A-433,
The Oil and Gas Journal, Tulsa, Okla.

**REFINERY GATE VALVES**
**Reconditioned and Tested**
**STEEL and CAST IRON**
**O.S.&Y. Flanged and Screw End**
**ALL STANDARD MAKES**
**Largest Stock in Midwest**
***We save you half***
**West Tulsa Pipe and Supply Co.**
**L.D. 635 P.O. Box 1865**
**TULSA, OKLAHOMA**

FOR SALE: Bargain. 2 strings rotary tools complete with steel derricks. Butane. Unitized. 3000' plus and 4000' plus capacities. Exceptionally good condition. Also 1 1940 Ford 134" W.B. Thornton-Tandem drive truck complete with heavy duty Tulsa Winch and tail roller. Box A-430, The Oil and Gas Journal, Tulsa, Oklahoma.

NOTICE — CABLE-TOOL CONTRACTORS. Save money; good used wire lines. All sizes up to 5,000 ft. long. See us before you buy. General Tool & Supply Co., P.O. Box 4387, Oklahoma City, Oklahoma.

FOR SALE AT OKLAHOMA CITY: 4—14" x 7¼" x 14" Ideal Union steam slush pumps. $500.00 each. I.T.I.O., Bartlesville, Okla.

25 K.W. and 40 K.W. Gas Engines, 220 volts, D.C. Two 100 K.W. Gas Engine-Generator Sets, 220 volts, D.C. 7x6 Ingersoll-Rand ER-1 Air Compressor. Six-inch Oster Pipe Threading Machine. Also large stock of lathes, pipe machines, milling machines, etc. Send for our list.
Terms to suit.
CINCINNATI MACHINERY & SUPPLY CO.
26 West 2nd St., Cincinnati, Ohio

FOR SALE: 1 Portable Oil Treating Machine Mfg. by Bridgeport Mfg. Co., capacity 60 bbl. per hour. Leonard Smith, 1910 First National Building, Oklahoma City, Oklahoma. LD 459, 2-5415.

FOR SALE: 6—40 gallon foam—outdoor type mounted fire extinguishers. Also 34—5 gallon foam type. I.T.I.O., Bartlesville, Okla.

BOILERS: 3—85 HP, 225# WP Acme. Ideal for Lease or Plant. Lucey Products Corp., Tulsa, Okla.

FOR SALE: One 50 HP Bessemer type GD single cylinder gas engine. $300.00. I.T.I.O., Bartlesville, Okla.

**TRACTORS**

Caterpillars, crawler type, size "35" $375; size "65" with nigger head winch $750; Caterpillar RD8 with Letroneau bulldozer. $2000; and Allis-Chalmers, Model L, with Baker bulldozer $1850. Perfect condition O. C. Evans, Mount Sterling, Kentucky.

FOR SALE: At Oklahoma City: 1—Muskogee Model "B" Skid Type Well Service Machine with PA-100 International Motor. I.T.I.O. Company, Bartlesville, Okla.

FOR SALE: Bignall-Keeler Pipe Machine 2"—6" Used 30 days, just like new. General Pipe & Supply Co., Box 1121, Kilgore, Texas.

FOR SALE at Oklahoma City: 10,000 ft. 6" Standard Lap Weld line pipe, 30c per foot. I. T. I. O., Bartlesville, Okla.

FOR SALE—Vertical Twin Cylinder 55 H.P. Bruce McBeth Gas Engine, $390 f.o.b. Brilliant, Ohio. Write P. O. Box 392.

FOR SALE: Approximately 1600 ft. 8¼"—28#SH Casing. Also "Repressuring Properties," shallow area. P. O. Box 111, Chanute, Kan.

FOR SALE: Oklahoma City. 150—8" Dresser—Dayton Long Sleeve Coupling less Rubbers. I. T. I. O., Bartlesville, Okla

FOR SALE: Refinery Equipment of all descriptions. Fractionating towers, treating towers, etc. built to your specifications. Write P. O. Box 1671, Wichita Kans., or Box 49, Fairfield, Ill. Western Tank & Road Supply Co.

5—15,000 GAL. factory built, quarter inch riveted, steel, gasoline storage tanks. Located at Wellington, Kans. First class condition. W. R. Price, Box 430, Winfield, Kans.

FOR SALE: 1—Ideco Portable Standard Rig suitable for drilling, pumping, or servicing, complete less motor. I.T.I.O., Bartlesville, Okla.

FOR SALE: Complete Gumbo Buster Russian Model Drilling Rig, Steel Tool House and all tools, good shape. $1100.00. Robert L. Childress, Corsicana, Texas.

FOR SALE near Bartlesville: 1—25 HP Black Bear (OWS) Gas Engine complete with 36" Straitaway Clutch. I.T.I.O., Bartlesville, Okla.

FOR SALE: 4—OCS Roller Bearing Chain Driven Sand Reels. I. T. I. O., Bartlesville, Okla.

FOR SALE: Model 15 Buckeye ditching machine, A-1 condition. Cheap for cash. A. L. Abrams, Woodville, Okla.

FOR SALE at Bartlesville: 1 set shear poles. Complete for National Drilling Machine. I. T. I. O., Bartlesville, Okla.

STEAM SLUSH PUMPS: 5—18" Luceys, 2—18" Johnson "G," 1—14" Ideal. Lucey Products Corp., Tulsa, Okla.

FOR SALE: At Bartlesville 1—2A National Portable Drilling Machine Less Tools. I. T. I. O. Co., Bartlesville, Okla.

**COMPLETE STEAM RIG**

First Class Condition — 2500 foot depth — South Texas Only. Will farm out on proven acreage for interest in same.

**C. McFAULL**
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SALE—New 9⅝"—13¾"—13" O.D. Casing Couplings. Want to buy a SHEAR and PLATFORM SCALE. Box 574, Tulsa.

**FOR SALE**

1 Rotary Drilling Rig D. C. Electric Powered By 2—300 HP Waukesha Gas Engines; complete LESS Drill Pipe.
1 Large Mechanical Rotary Drilling Rig, Tex-Rope driven with Large Portable Clutch powered by 2—300 HP Waukesha Gas Engines; complete LESS Drill Pipe.
1 Cable Tool Drilling Unit Lee C. Moore Type "B" Front, Unitized Bull Wheels with ⅞" x 4500' Drilling Line, O.C.S. Greyhound Chain driven Sand Reel complete with ⅞" x 5500' Sand Line, Boiler, Engine and Tools Complete. Has drilled in two wells after Rotary. Practically new.

FOR FURTHER INFORMATION AND INVENTORY WRITE
Box A-401,
The Oil and Gas Journal, Tulsa, Okla.

## New York Markets

*(Continued from Page 117)*

Both clean and dirty vessels are reported to be in good demand, indicating that further changes in the coastwise rates will also be upward.

No changes were reported in lubricating-oil prices last week though the market, particularly for 600 steam refined stock, remained strong. Much of the strength in lubricating oils is believed to be in anticipation of future demands. While the improvement in lubricating oils has been in progress for some time, as late as the end of February inventories were still increasing. National Petroleum Association reports show that Pennsylvania bright stock and neutral shipments in February were under those of January.

Wax likewise exhibited additional strength, and, according to reports, none was available at less than 3 cents per pound in the New York area. This was particularly true of higher-melting-point waxes, though lower-mleting-point grades were also in better demand for reprocessing.

## Tank-Wagon Changes

*(Continued from Page 118)*

er-tank-wagon prices of regular gasoline 0.2 cent per gallon March 18 at Buffalo and Syracuse, N. Y., and raised 0.3 cent on both classes of delivery the same day at Rochester, N. Y. The consumer-tank-car price at Providence, R. I., and Boston, Mass., was advanced 0.3 cent per gallon, March 26. Consumer-tank-car price was advanced 0.4 cent and the dealer-tank-wagon quotation was lifted 0.5 cent March 19 at Worcester, Mass.

Standard Oil Co. of Louisiana reduced the kerosene tank-wagon price 0.5 cent per gallon March 22 at Memphis, Tenn.

## Crude-Oil Price Change

Crude-price schedules are unsettled this week because of changes made by several companies in Texas and Illinois, causing an interruption in The Oil and Gas Journal's regular policy of publishing complete details on postings for all fields in the first issue of each month. The previous policy will be resumed in April. Meanwhile, changes will be published as they are announced. The Humble Oil & Refining Co.s new schedule in Texas, Sohio Corp.'s changes in Illinois and other adjustments appear in the news section of this issue.

## Texas Relaxes Truck Load Limits

FORT WORTH, Tex., Mar. 31.—Trucking regulations, long a problem to operators in Texas, were modified by the state legislature last week to permit gross loads of 38,000 lb. as determined by a scientific formula, instead of the present maximum 14,000 lb.

The state senate concurred in house amendments to the new trucking bill and the measure was sent to the governor for signature.

Working hours of truck drivers were limited to 10 in a 24-hour period, with violations to be subject to a fine of $25 to $200. Imposed penalties for weight violations range from $25 for first offense to $500 and 6 months in jail for repeated convictions.

Width and length specifications of the old trucking laws were not changed. In other words, the "caravans" of trucks and trailers common in other states or one tractor truck and two or three trailers still will be banned on Texas roads.

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